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TRANSMISSION EXPERIMENTS IN SERUM JAUNDICE AND INFECTIOUS HEPATITIS

JOHN R. PAUL, M.D.
NEW HAVEN, CONN.

MAJOR W. P. HAVENS JR.
MEDICAL CORPS, ARMY OF THE UNITED STATES

LIEUTENANT COLONEL A. B. SABIN
MEDICAL CORPS, ARMY OF THE UNITED STATES

AND

LIEUTENANT COLONEL C. B. PHILIP
SANITARY CORPS, ARMY OF THE UNITED STATES

In this paper we describe our experiences with the transmission of serum (or plasma) jaundice and infectious hepatitis. Actually these two conditions may be closely related in that the former may represent the artificial production of the latter; but, while this may be true in some instances, it cannot yet be said that all serum jaundice belongs in this category. The etiologic agents in both of these conditions appear to be quite similar, and this holds for the clinical picture, which in both resembles "catarrhal jaundice." On the other hand there are differences which are poorly understood and can be best illustrated perhaps in terms of transmission experiments.

HOMOLOGOUS SERUM JAUNDICE

Homologous serum jaundice is not easy to define. It is produced by the parenteral inoculation of whole blood, serum or plasma, ordinarily obtained from an individual who is supposedly nonjaundiced, or at least from a donor not known (at the time) to be ill with infectious hepatitis. Such a definition is highly artificial, as is also the disease itself. But this does not detract from its significance, for serum jaundice is an important and common entity, with numerous examples resulting from the prophylactic injection of serum for measles,[1] mumps,[2] other virus diseases [3] and also from vaccines containing serum,[4] as well as from the experimental injection of some of these serums.[5] It appears that the "icterogenic capacity" of various lots of serums differs as far as the rates at which jaundice is produced and the lengths of the incubation periods are concerned.

The agent of serum jaundice has not been actually "isolated" in the sense that it has been seen, cultured or transmitted to laboratory animals, in spite of repeated attempts by Findlay and Martin,[6] Oliphant and his associates [7] and Sawyer and his associates.[8] It is known to be filtrable and to be sufficiently heat resistant to withstand 56 C. for one hour.[7] It produces jaundice in human beings somewhat irregularly when given parenterally, with a clinical picture not unlike that of infectious hepatitis (table 1). The incubation period is long (seventy to one hundred days or more) although mild hepatitis may occur early in this long incubation period—many days before true jaundice is actually recognizable.[9]

Serum jaundice has been transmitted in human beings by feeding serum in 1 instance,[10] and it is possible that this has been accomplished with nasopharyngeal washings.[6]

Our own transmission experiments with serum jaundice were first carried out in the Middle East (first series, chart 1) and later supplemented by work in this country (see second series). Twenty-six individuals

From the Middle East Laboratory of the Commission on Neurotropic Virus Diseases and the Section of Preventive Medicine, Yale University School of Medicine.

These investigations were aided in part by the Commission on Neurotropic Virus Diseases, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, Preventive Medicine Service, Office of the Surgeon General, United States Army.

Assistance was received from Col. D. W. Billick, M. C., Lieut. Col. Thomas G. Ward, M. C., Col. Hall G. Van Vlack, M. C., Lieut. Col. R. B. Nye, M. C., Col. O. B. Bolibaugh, M. C., and Dr. S. F. Price, U. S. Public Health Service.

Assistance and cooperation were given by the Selective Service, Camp Operations Division; Civilian Public Service Unit No. 68; Civilian Public Service Unit No. 81; the Norwich State Hospital, Norwich, Conn.; the Connecticut State Hospital, Middletown, Conn., and the Federal Correctional Institution, Danbury, Conn.

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5. Oliphant, Gilliam and Larson.[7] Oliphant.[7] Neefe, Stokes, Reinhold and Lukens.[9] MacCallum and Bauer.[10]

6. Findlay, G. M., and Martin, N. H.: Jaundice Following Yellow Fever Immunization: Transmission by Intranasal Instillation, Lancet **1**: 678 (May 29) 1943.

7. Oliphant, J. W.; Gilliam, A. G., and Larson, C. L.: Jaundice Following Administration of Human Serum, Pub. Health Rep. **58**: 1233 (Aug. 13) 1943. Oliphant, J. W.: Jaundice Following Administration of Human Serum, Harvey Lecture Series **39**: 254, 1943-1944.

8. Sawyer, W. A.; Meyer, K. F.; Eaton, M. D.; Bauer, J. H.; Putnam, P., and Schwentker, F. F.: Jaundice in Army Personnel in the Western Region of the United States and Its Relation to Vaccination Against Yellow Fever: Part III, Am. J. Hyg. **40**: 90 (July) 1944.

9. Neefe, J. R.; Stokes, J.; Reinhold, J. G., and Lukens, F. D. W.: Hepatitis Due to the Injection of Homologous Blood Products in Human Volunteers, J. Clin. Investigation **23**: 836 (Sept.) 1944. MacCallum and Bauer.[10]

10. MacCallum, F. O., and Bauer, D. J.: Homologous Serum Jaundice: Transmission Experiments with Human Volunteers, Lancet **1**: 622 (May 13) 1944.

were tested. The icterogenic agent used was originally derived from a serum pool collected from British and American troops in the course of studies on sandfly fever in Egypt.[11]

Material from this inoculum (pool 1) produced sandfly fever in 9 out of 10 inoculated volunteers after the

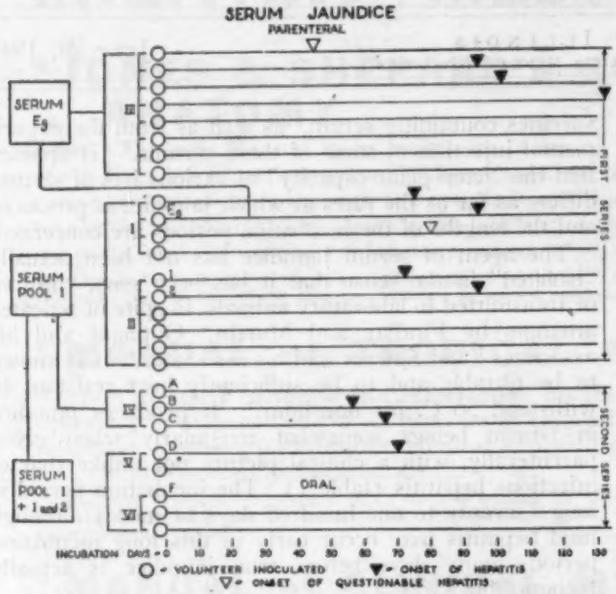

Chart 1.—Results of administering icterogenic serum (homologous serum jaundice) to six groups of human volunteers, each subject being represented by a horizontal line. The six groups are indicated by the Roman numerals at the left of the column of circles. The first series and the second series (indicated on extreme right) represent experiments done in the Middle East and in the United States respectively.

usual incubation period of from three to five days. Beginning at about seventy days after the first inoculation and sixty days after the attack of sandfly fever was over, a member of this group of 10 volunteers developed jaundice and suspicion was immediately

TABLE 1.—*Experimental Serum Jaundice Produced Parenterally in Human Volunteers*

Author	Serum Inoculum	Number Tested	Number Positive *	Incubation to Onset of Jaundice †
Oliphant and others [7]	In yellow fever vaccine and serum of vaccines	180	30	28 - 133
MacCallum and Bauer [10]	Various types homologous serums	5 11	2 4	63 - 70 59 - 129
Neefe and others [9]	Mumps convalescent	6	5	73 - 110
	Passage of foregoing	2	0	
	In yellow fever vaccine	2	1	99

* Only those men who developed clinical jaundice are listed as positive. Hepatitis without jaundice also occurred.
† Days between inoculation and onset of jaundice.

aroused that besides the virus of sandfly fever there had also been an icterogenic agent in pool 1. The original acute sandfly fever patients who had acted as donors for the blood samples in pool 1 had all been living (during June 1943) within an area endemic for infectious hepatitis, although at the time the samples were obtained the prevalence of this disease was low. The donors had been questioned specifically at the time the blood was drawn and had stated that they had not had jaundice recently. Attempts were therefore made in October 1943 to trace the fate of these donors. Information was obtained from 10 of them. None of these reported having had jaundice during the four month period after they had been bled (June to October 1943). The eleventh man had left the country and could not be traced.

Nevertheless, in spite of inability to ascertain its source, suspicion that there was an icterogenic agent in our pool 1 was well grounded, for in due course 3 more of the 10 volunteers developed hepatitis, giving us an incidence of 40 per cent. This occurred during the local hepatitis season (October to February), but actually the prevalence of infectious hepatitis at the desert camp where the volunteers were quartered was very low (under 0.5 per cent) at this time, in contrast to the higher prevalence of the disease in adjacent areas.

Details of these inoculations are recorded in table 2. Here the volunteers, listed as groups I and II, are seen to total 10 men in all. Four of them developed jaundice after incubation periods ranging from seventy-two to ninety-four days. Two other members of the whole group of 10 were ill with a nonicteric illness during the same general period (September to December 1943); viz., 1 volunteer (Pvt. Dk.), who had a history of psychasthenic difficulties in the past, became nervous and depressed and was hospitalized for a period of two months. Jaundice was not clinically evident in this patient. Another (Pvt. By.) was hospitalized during December with the diagnosis of atypical pneumonia.

The next experimental cases occurred in group III (table 3), consisting of 8 subjects who had submitted to skin tests on Aug. 21, 1943. The tests were performed with serum obtained from Pvt. Eg. on Aug. 18, a member of group I. The blood was drawn from Pvt. Eg.

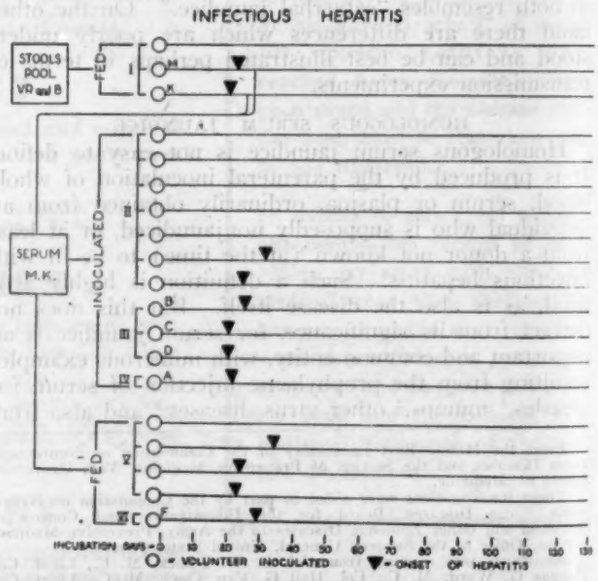

Chart 2.—Experimental infectious hepatitis in six groups of human volunteers. Legends as in chart 1. Groups I, II and V represent 14 normal subjects. Groups III, IV and VI represent 5 subjects, B, C, D, A and F, all used six months previously in the serum jaundice experiment in chart 1, second series. Three of these subjects, B, C and D, were convalescent from serum jaundice. The stools pool (see upper left) consisted of (VR) a pool of dehydrated Seitz filtrates of stool and urine extracts from British soldiers in various stages of infectious hepatitis, prepared by Major C. E. van Rooyen, R. A. M. C., and (B) a stool obtained eight days after the appearance of jaundice in an American soldier with infectious hepatitis.

thirty-four days after his first inoculation with icterogenic serum (on July 15) and sixty days prior to the date on which he developed jaundice. In other words, the sample was obtained during the early part of a long

11. Sabin, A. B.; Philip, C. B., and Paul, J. R.: Phlebotomus (Pappataci or Sandfly) Fever, a Disease of Military Importance, J. A. M. A. **125**: 603 (July 1), 693 (July 8) 1944.

incubation period, preceding his attack of serum jaundice. Eg.'s serum was heated at 56 C. for half an hour before it was used for skin testing the 8 persons in group III. Of the 8 persons who received 0.1 cc. of Eg.'s heated serum intracutaneously, 3 developed jaundice after incubation periods ranging from ninety-four to one hundred and thirty-two days (table 3). Besides these 3, 2 other members of group III contracted nonicteric illnesses during the one hundred and thirty day period following the skin tests; viz., 2d Lieut. Cs. (a nurse) was hospitalized between October 4 and November 14 suffering from indefinite symptoms of malaise and diarrhea. The exact nature of her condition was not determined. She was discharged from the hospital with a diagnosis of pyelonephritis (mild, nonsuppurative) and anemia (type undetermined). Another person, T/3 Td., was hospitalized for a short time beginning November 20 with the diagnosis of respiratory infection. There was no evidence of jaundice in these 2 patients.

These experiments were repeated several months later in the United States (see second series in chart 1). Pool 1 alone (and mixed with first passage serums) was used. It produced serum jaundice in 3 of 5 volunteers inoculated parenterally. Three attempts to produce jaundice by the oral administration of this icterogenic serum were negative.

It thus appears that jaundice was produced parenterally 10 times in 23 individuals with different (first and second) passages of this icterogenic material and that the incubation period was invariably long (fifty to one hundred and thirty-five days).

TABLE 2.—*Jaundice Cases Following Inoculation of Serum from Pool 1*

Group	Subject	Dose in Cc.	Route of Inoculation *	Dates of Inoculation	Subsequent Jaundice	Onset of Symptoms	Onset of Jaundice	Incubation Period †	Comment
I	Cpl. Rb.	1.0 and 0.1	sc. and ic.	7/15 and 7/28	++	?	9/28	75	Below par from 8/18 until discharge from hospital 11/17
	Pvt. Eg.	1.0 and 0.1	sc. and ic.	7/15 and 7/28	+	9/30	10/17	94	
	Pvt. Dk.	1.0 and 0.1	sc. and ic.	7/15 and 7/28	—	?	.....	..	Nervousness and depression requiring hospitalization 8/20
	Cpl. Bl.	1.0 and 0.1	sc. and ic.	7/15 and 7/28	—	.....	.....	..	
II	Cpl. Dm.	0.2 and 0.1 ‡	ic.	8/19 and 8/22	++	10/25	10/30	72	
	Pvt. Hb.	0.2 and 0.1	ic.	8/19 and 8/22	++	11/ 1	11/11	94	Developed eczema after jaundice attack
	Cpl. Pr.	0.2 and 0.1	ic.	8/19 and 8/22	—	.....	.....	..	
	T/5 Bd.	0.2 and 0.1	ic.	8/19 and 8/22	—	.....	.....	..	
	Pvt. By.	0.2 and 0.1	ic.	8/19 and 8/22	—	11/23	.....	..	Hospitalized 12/1-12/23; diagnosis, atypical pneumonia
	Pfc. Rg.	0.2 and 0.1	ic.	8/19 and 8/22	—	.....	.....	..	

* sc. = subcutaneous; ic. = intracutaneous.
† Days between first inoculation and onset of jaundice.
‡ Given in 3 piqûres: 0.1 cc. fresh serum and 0.1 cc. heated serum on August 19, and 0.1 cc. fresh August 22.

TABLE 3.—*Jaundice Cases Following Intracutaneous Inoculation of 0.1 Cc. of Heated Serum from Eg. (8/18)*

Group	Subject	Date of Inoculation	Subsequent Jaundice	Onset of Symptoms	Onset of Jaundice	Incubation Period	Comment
III	2d Lt. Cn.	8/21	—	10/ 4	—	—	Hospitalized 10/4 to 11/14
	Capt. Hn.	8/21	++	11/17	11/23	94	Hospitalized 11/23 to 1/15
	P.	8/21	++	11/17	12/ 1	101	Hospitalized 12/3 to 2/1
	Pvt. Hk.	8/21	+	1/ 1	1/ 6	132	Hospitalized 1/7 to 2/1
	Major S.	8/21	—	.....	—	...	
	T/3 Td.	8/21	—	11/20	—	...	Hospitalized 11/20, respiratory infection
	T/3 Dw.	8/21	—	.....	—	...	
	Cpl. Sp.	8/21	—	.....	—	...	

INFECTIOUS HEPATITIS

Infectious hepatitis has an older and less artificial history. It is common and widespread and in the present war, as in former wars, has been prevalent among the troops. As far as published records are available, this seems to have been especially true of British forces in the Middle East,[12] but the disease has not been limited to the British or to that particular geographic area, for it has occurred in the French army in Tunisia,[13] in the Italian army in Sicily in 1941[14] and in the German army.[15] American troops in North Africa[16] and Italy have not been spared.

There is as yet no good reason to believe that this Middle Eastern type of infectious hepatitis differs from that which has been noted in the United States[17] or differs from the disease frequently described as infective hepatitis in England[18] or as hepatitis epidemica in Scandinavia,[19] Germany[20] and many other parts of the world. There is still no ready means of differentiating it from catarrhal jaundice,[21] except that the latter term has been applied more to sporadic than to epidemic cases. These and other questions deserve extensive further study, but on two points at least

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there is universal agreement; namely, infectious hepatitis can be differentiated from spirochetal jaundice (Weil's disease) and from yellow fever.

The manner in which infectious hepatitis spreads from person to person is not completely known, but the intestinal-oral circuit has long been suspected.[22] Recently this has been proved experimentally to be one means of transfer.[23] Not only does the disease flourish under poor sanitary conditions but it frequently (although by no means always) follows outbreaks of intestinal disease. Kirk's study [24] of infectious hepatitis among New Zealand soldiers at Alamein in Egypt in 1942 led him to believe that the disease was spread by flies carrying the infection from human excreta.

Exact knowledge as to immunity in this disease is not yet available. It has been noted that troops newly introduced into an endemic or epidemic area are more susceptible to infectious hepatitis than is the local population. This observation has been made in Egypt [25] (where the disease has been regarded by civilian doctors as essentially one of childhood), in Palestine,[26] in Malta [27] and elsewhere. This suggests but does not establish the fact that immunity is readily acquired. On the other hand, second attacks are said to occur. It is also pertinent to mention that (with the exception of one experimental report by Oliphant [28]) there is little evidence that immunity to infectious hepatitis is induced by an attack of serum jaundice or of "catarrhal jaundice."

Etiologic Agent.—Like that of serum jaundice, the agent of infectious hepatitis has not been transmitted to laboratory animals in spite of attempts by van Rooyen and Gordon,[12] Cameron [29] and others. In our own laboratories both in the Middle East and in this country we have tried in vain to transmit infectious hepatitis to white mice, guinea pigs, hamsters, gerbils, Cercopithecus, Erythrocebus and Macacus monkeys and Abyssinian baboons. It is possible that the type of jaundice transmitted to pigs in Denmark by Andersen [30] was infectious jaundice of this type. More recently Siede, working with Meding, and Luz [31] in Germany, claims to have propagated this agent in the developing chick embryo, and Dresel and his associates [32] claim to have infected birds with it. These reports have not been confirmed. Nevertheless it has been passed serially in man (two passages), thus conclusively indicating the infectious nature of the disease [33] and by using man as the experimental animal some of the properties of the agent of infectious hepatitis have been determined. Thus, like the agent of serum jaundice, it also has been found to resist heating at 56 C. for one-half hour and to pass bacteria tight filters.[33] As in serum jaundice, the agent or virus is present in the blood stream during active stages of the disease [34] and for an indeterminate period before the onset of jaundice. It is similarly present in feces [35] and perhaps in the urine.[36] Furthermore, experimental infectious hepatitis can be readily produced in man by the oral route [35] (table 4).

TABLE 4.—*Experimental Infectious Hepatitis Produced in Human Volunteers by Various Investigators* *

Parenteral							Oral					
Authors	Year	"Inoculum"	Route Inoc.†	Number Tested	Number Positive	Incubation Periods	Authors	Year	"Inoculum"	Route Inoc.†	Number Tested	Number Positive	Incubation Periods
Voegt [37]	1942	Serum	sc.	?	1	19 ?	Voegt [37]	1942	Duodenal fluid	Oral	4	1 ?	28
Cameron [29]	1943	Blood Serum	im.	6	6	30 and 39+	Voegt [37]	1942	Urine	Oral	?	1	?
							Voegt [37]	1942	Blood	Oral	?	1	?
Oliphant [28]	1944	Serum	sc.	21	4	85 - 106	MacCallum and Bradley [38]	1944	Nasal wash.	in.	16	0	..
MacCallum and Bradley [38]	1944	Serum	sc.	6	3	64 - 92	MacCallum and Bradley [38]	1944	Urine	in. Oral	19	0	..
Havens and others [3...40]	1945	Serum	sc. ic.	11	6	20 - 31	MacCallum and Bradley [38]	1944	Feces	in.	26	3	27-31
							Havens and others [39]	1944	Feces (froz.) Feces and urine (extr. dried)	Oral	3	2	20-22
							Havens and others [39]	1944	Feces and urine (extr. dried)	Oral	3	0	..
							Havens and others [33, 40]	1945	Serum	in. Oral	5	4	23-34

* Only those cases in which clinical jaundice developed have been listed as positive.
† sc. = subcutaneous; ic. = intracutaneous; im. = intramuscular; iv. = intravenous; in. = intranasal and in most cases intrapharyngeal.

Among early claims of success at transmission are those of Voegt [37] in Germany. Details are incomplete, but Voegt described having infected 1 out of 4 volunteers by feeding them duodenal fluid. He also claimed that he produced hepatitis experimentally by the inoculation of human serum and by the ingestion of urine and of hemolyzed red blood cells.

In Cameron's investigations,[29] carried out in Palestine, serum and whole blood from cases of hepatitis were injected intramuscularly. Seven volunteers were inoculated, of which 6 could be followed. All of these developed jaundice, although details as to the time of onset are not available.

22. Blumer, G.: Infectious Jaundice in the United States, J. A. M. A. **81**: 353 (Aug. 4) 1923.
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25. Personal communication to one of the authors (J. R. P.).
26. Kligler, I. J.; Btesh, D. S., and Koch, W.: Observations on Two Epidemics of Infective Hepatitis in Palestine Among Recent Immigrants, J. Infect. Dis. **74**: 234 (May-June) 1944.
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34. Cameron.[29] MacCallum and Bradley.[38] Havens, Ward, Drill and Paul.[39]
35. MacCallum and Bradley.[38] Havens, Ward, Drill and Paul.[39] Findlay and Wilcox.[36]
36. Findlay, G. M., and Wilcox, R. R.: Transmission of Infective Hepatitis by Feces and Urine, Lancet **1**: 212 (Feb. 17) 1945. Voegt.[37]
37. Voegt, H.: Zur Aetiologie der Hepatitis epidemica, München. med. Wchnschr. **89**: 76 (Jan. 23) 1942; abstr., Bull. Hyg. **17**: 331 (May) 1942.

Most significant experiments have been recently reported in a short note by MacCallum and Bradley,[38] who found the virus in the feces, and that the disease can be induced (after a "thirty day" incubation period) by feeding such material to arthritic patients who volunteered for these experiments. The infective fecal material was collected from several patients in the early stages of infectious hepatitis. A few positive results were also obtained both from nasopharyngeal washings (which gave rise to subicteric hepatitis in volunteers) also after a relatively short incubation period—twenty-seven to thirty-one days.

These results have been independently duplicated and somewhat enhanced by Havens and his associates [39] in our own laboratory of the Neurotropic Virus Disease Commission of the U. S. Army, where healthy human subjects have been used for the tests. The infective material was also collected from American and British troops during acute stages of infectious hepatitis acquired in the Middle East and Mediterranean area. It was kept frozen until administered by various routes to several groups of human volunteers in the United States (chart 2). The most important findings can be summarized as follows:

When fecal material from patients with the naturally occurring disease was fed to human volunteers, 2 out of 3 contracted the disease in twenty and twenty-two days respectively.[39] Serum obtained from these 2 patients in the preicteric phase was filtered (Chamberland number 2) and immediately afterward heated (56 C. for thirty minutes). This heated serum filtrate (MK) produced infectious hepatitis when fed to 4 of 5 human volunteers with an incubation period ranging from twenty-three to thirty-four days. The same material was simultaneously inoculated parenterally in the same amount and produced infectious hepatitis in 6 of 11 volunteers with an incubation period ranging from twenty to thirty-one days.[40] Some of the latter group of volunteers had recovered some months before from serum jaundice, but this did not protect them against an attack of infectious hepatitis.[40]

It thus appears in experiments with one strain of the virus that jaundice was produced 6 times in 11 subjects when the virus was inoculated and 6 times in 8 subjects when the virus was fed and that the incubation period was invariably less than thirty-four days in these experiments.

SUMMARY

Transmission experiments in man have enhanced our knowledge of serum jaundice and infectious hepatitis.

In serum jaundice the interval between inoculation and the development of symptoms is usually relatively long, averaging from sixty to one hundred and twenty days.

The agent (or "virus") of serum jaundice is in the blood during active stages of the disease and also during the interval between inoculation and the development of serum jaundice. In 1 instance it was present in blood obtained sixty days prior to the onset of jaundice.

Experimental work indicates that the agent or agents of serum jaundice and of infectious hepatitis are quite similar, as is also the clinical picture of the disease produced, resembling, as it does, the picture of catarrhal jaundice.

The agent or agents of serum jaundice and of experimental hepatitis are both filtrable and both relatively resistant to heat.

A prominent difference between serum jaundice and infectious hepatitis, yet to be explained, lies in the length of the incubation period, which may be quite variable, but in our experimental cases of infectious hepatitis it tended to be from eighteen to thirty days, in contrast to the sixty to one hundred and twenty day incubation period of experimental cases of serum jaundice.

Three patients who had recovered from serum jaundice six months before were not found to be immune to experimentally induced attacks of infectious hepatitis. However, little is known regarding immunity in infectious hepatitis, and the ease with which these 3 patients were "reinfected" is not regarded as an indication that the two diseases are fundamentally different.

The virus of infectious hepatitis is in the blood and in the feces during active stages of the disease.

Infectious hepatitis can be readily produced in man by the oral route. This can be accomplished by feeding infective feces or by spraying such material into the nasopharyngeal passages. Similarly the disease can be produced by feeding infective serum as well as by its parenteral administration.

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EXTRATHYROID EFFECTS OF THIOURACIL THERAPY

ELLA H. FISHBERG, M.D.
AND
JEFFERSON VORZIMER, M.D.
NEW YORK

Thiouracil, a derivative of thiourea, exerts a powerful depressant action on the production of thyroid hormone and hence has been applied clinically to secure reduction of the basal metabolic rate in thyrotoxic patients. During the past twenty-one months we have used thiouracil in the treatment of a series of 96 patients with hyperthyroidism, which in many of the patients was complicated by other conditions and, in addition, there were several who were reluctant to undergo a second operation for recurrent hyperthyroidism. We have been much impressed by the favorable effect of the drug on these extrathyroid complications caused by the heightened basal metabolism or by a disturbance of glandular equilibrium, or both. As the basal metabolic rate fell, we observed a high degree of amelioration in the cardiac sequelae, great lessening of the associated diabetes, decrease in exophthalmos and improvement of the psychic state. On the other hand, in contrast to previous reports, we have encountered a much higher incidence of granulopenia, about 20 per cent, including 1 case of typical agranulocytosis.

In general, the dosage was 1 Gm. daily for three days, followed by 0.6 Gm. until the basal metabolic rate dropped to within normal limits, approximately + 10 or less. In the 15 cases of sustained remission for periods between two and fifteen months, all medication was dropped. In every case in which more than 0.2 Gm. was administered daily, it was a fixed rule that a white blood count had to be made every three days, and a differential count, if there was over 20 per cent drop in

From the Biochemical Laboratory and the Medical Division of the Beth Israel Hospital. With the technical assistance of Virginia Rechnitzer, B.A.

the total number of leukocytes. When the maintenance dose was reduced to 0.2 Gm. or less and the leukocyte count remained within normal limits, 0.2 Gm. daily was given for one week, no medication for the second week and 0.2 Gm. daily for the third week. A blood count was then made. This method reduces the necessary blood counts from one every three days to one every three weeks and sufficient thiouracil is administered to maintain the basal metabolic rate within normal limits. There were no restrictions put on the patients, who were freely ambulatory.

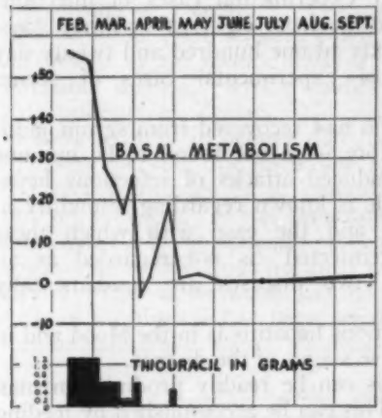

Chart 1.—Drop in basal metabolic rate in an uncomplicated case of hyperthyroidism. The patient continued work as a welder in a shipyard during the entire period of therapy apparently in continued remission.

The first response was subjective. After seven to ten days the patients stated that they felt calmer. Charts 1, 2 and 3 sum up the metabolic changes. With lowering of the basal metabolic rate there were objective signs of loss of agitation, decreased perspiration, decrease to loss of tremor and disappearance of diarrhea. It was striking that there was a lag in the slowing of the pulse and in the gain in weight, particularly the latter. In some cases there was even a slight loss of weight during the first weeks of active treatment, but following this there was a gradual gain, amounting in 1 case to 55 pounds (25 Kg.). In many cases loss of tachycardia did not occur until a considerable period after the drop in basal metabolic rate. This lag in response would perhaps be expected from the pharmacologic action of the drug. Shortly after thiouracil is taken the rate of synthesis of the thyroid hormone falls and the thyrotropic hormone of the pituitary, released in excess, stimulates the thyroid gland and liberates the hormone stored therein. When this accumulated thyroid hormone is used up, since none is now being produced, the basal metabolic rate falls. Contrary to the findings in animal experiments, we were unable to note any increase in size of the thyroid gland or increased exophthalmos in human beings as a result of thiouracil therapy. On the contrary, we found a decrease in one or both, in the majority of cases.

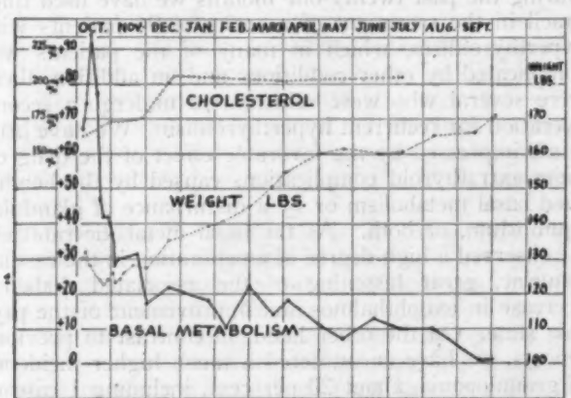

Chart 2.—Lag in gain in weight and rise in blood cholesterol.

Our results would point to thiouracil therapy as an ideal method for securing reduction in basal metabolic rate with a minimum of effort. It entails no interruption of the patient's normal occupation nor prolonged periods of rest and often avoids the necessity of operation, were it not for the ever possible danger of granulopenia and true agranulocytosis if the drug is not stopped forthwith. There seems to be no cumulative action of the drug itself, because 1 patient who developed granulocytopenia (chart 4) showed a maximum thiouracil concentration of 3 mg. per hundred cubic centimeters [1] in the blood with a normal excretion, while another with no drop in the white count showed a concentration of 6.75 mg. per hundred cubic centimeters. Rabbits, carried along for months on the comparatively enormous dosage of 0.1 Gm. daily, with a concentration of 9 mg. per hundred cubic centimeters in the blood, showed no granulopenia nor bone marrow changes. It can be seen from chart 4 that three separate attempts were made to reinstate thiouracil therapy but each time neutrophilic granulopenia followed. One patient developed granulopenia on the eighty-fifth day of therapy, while the white count of another patient dropped from 8,100 to 4,400 thirty-six hours after taking the drug. In the following cases thiouracil therapy had to be interrupted and finally terminated because of intolerance to the drug, manifested mainly by a toxic effect on the bone marrow:

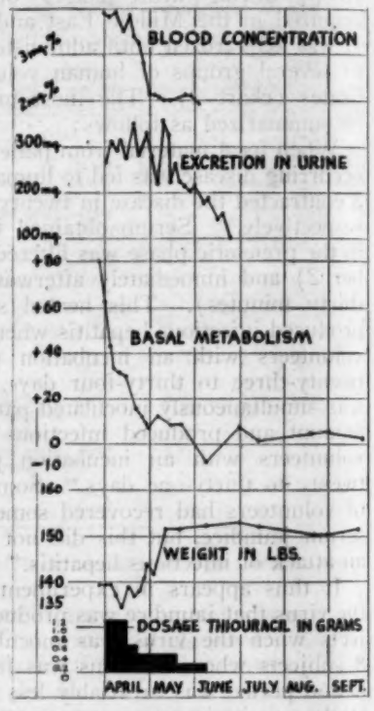

Chart 3.—Typical concentration of thiouracil in blood and excretion in urine during period of intensive therapy.

Case 1.—E. F., a woman aged 38, was admitted with a three months history of nervousness, loss of 19 pounds (8.6 Kg.), sweating and palpitation. Examination revealed agitation, tremor, sweating and enlargement of the thyroid. The basal metabolic rate was +41. After 1.2 Gm. of thiouracil had been given for ten days there was a drop in white blood cells from 9,700 to 5,000 with a pronounced decrease in granulocytes. No constitutional reaction was noted. At this time the basal metabolic

1. A very simple method, using the reagent for the detection of acetone that is found in every laboratory, was developed for the clinical determination of thiouracil in blood, urine or body tissues. It was based on the finding by Grote that sodium nitroprusside, when treated by various reagents, gives a color with compounds containing a sulfur radical in organic combination. We found that thiouracil will give a green color when treated with sodium nitroprusside which has been exposed to the action of ultraviolet light for two and three-fourths hours. Method: To 1 cc. of blood serum or urine there is added 1 cc. of a 5 per cent solution of irradiated sodium nitroprusside and 1 cc. of a buffer phosphate solution of *p*H 5.5. After ten minutes a green color develops which can be measured in a colorimeter or photoelectric colorimeter (red filter) against a standard solution of thiouracil similarly treated. Grote, I. W. L.: A New Color Reaction for Soluble Organic Sulfur Compounds, J. Biol. Chem. **93**: 25, 1931.

rate dropped to + 13. Because of the toxic effect on the bone marrow, the patient was prepared for operation. Thyroidectomy was performed. There was no excessive bleeding at operation and the patient made an uneventful recovery.

CASE 2.—L. S., a woman aged 30, married, admitted to the hospital with a history of palpitation, oligomenorrhea, nervousness, excessive perspiration and diarrhea of several months' duration and a loss of 10 pounds (4.5 Kg.) in one month, had noted prominence of the eyes and enlargement of the neck.

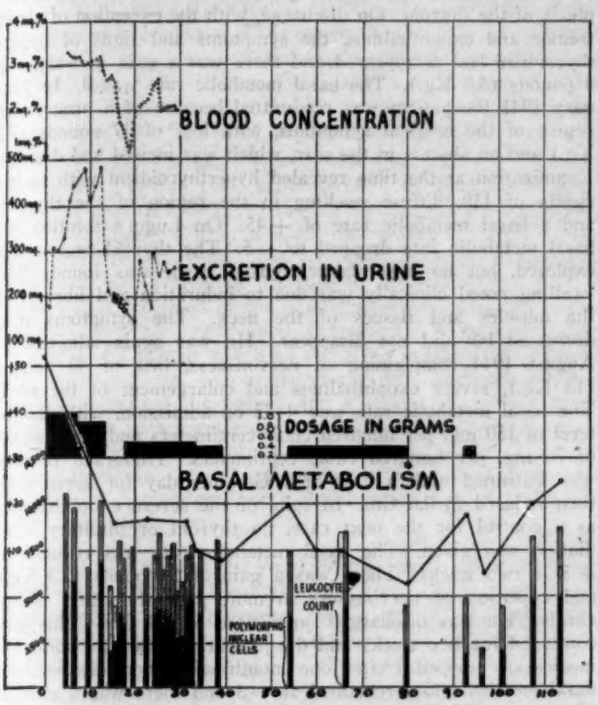

Chart 4.—Three attempts to reinstate thiouracil therapy in a patient sensitive to thiouracil.

Examination revealed agitation, tremor, perspiration and tachycardia, with slight exophthalmos. The basal metabolic rate was + 58. Cholesterol was 178 mg. per hundred cubic centimeters. Thiouracil therapy was inaugurated on February 1 with a dosage of 1.2 Gm. daily. After the first week the patient noted that she felt calmer and that the sweating was much less. The basal metabolic rate fell steadily so that it was + 54 on February 16, + 44 on February 21 and + 29 on February 25. On the morning of the 26th the patient complained of severe headache, pains in the legs and nausea, and she felt chilly. There was a rise in temperature to 104.4 F. At this time generalized enlargement of the lymph nodes was noticed. The nodes were firm, discrete and almost 1 cm. in diameter. Some were tender and others only slightly so. The spleen was not palpable. The white blood cell count was 9,700, with 80 per cent polymorphonuclear cells. No rash was seen. Thiouracil was stopped and the temperature returned to normal. The adenopathy persisted and the white blood count dropped to 5,800. By February 28 the adenopathy had disappeared and the basal metabolic rate was found to be + 7. On the 29th thiouracil was ordered. Following the second dose there was a recurrence of headache, muscular pains and chilliness, with a rise in temperature to 103.6 F. Examination again revealed lymph node enlargement but no rash. Because of the definite intolerance to the drug, this therapy was not attempted again. Only after two months had this patient shown a high degree of sensitivity to the drug. Since the hyperthyroidism had been so well controlled, thyroidectomy was performed at once. As in case 1, no excessive bleeding was noted. The postoperative course was uneventful and the patient was discharged on the thirteenth postoperative day with a basal metabolic rate of + 1.

CASE 3.—E. E., a woman aged 35, married, admitted in July 1944, complained of weakness, loss of 20 pounds (9 Kg.), nervousness, excessive perspiration, palpitation and tremor of four months' duration. Examination revealed typical hyperthyroidism with no exophthalmos or palpable enlargement of the gland. The basal metabolic rate was + 70. Cholesterol was 152 mg. per hundred cubic centimeters. Thiouracil 1 Gm. daily was started on July 17. On the 19th the dose was reduced to 0.6 Gm. The white blood cell count varied between 6,700 and 7,600, with 60 to 70 per cent polymorphonuclear cells until July 28, when there was a sudden drop to 4,800 with 20 per cent polymorphonuclear cells and the patient complained of diffuse myalgia and arthralgia. This was associated with a rise in temperature to 103 F., generalized lymph node enlargement and a palpable spleen. Thiouracil was stopped and within twenty-four hours all signs of a reaction had disappeared, with the temperature returning to normal within twelve hours. During the next two days, in spite of a normal white count, the granulocytes were only 42 per cent. The patient was then given Lugol's solution and referred to the surgical service, where thyroidectomy was performed. There was no increased bleeding and the postoperative course was uneventful.[2]

CASE 4.—Y. L., a woman aged 37, a nurse, was admitted on March 14, 1944 with complaints of nervousness and perspiration, frequent diarrhea, increasing prominence of the eyes and loss of 11 pounds (5 Kg.) in two months. Examination revealed tachycardia, an enlarged thyroid, especially the right lobe, exophthalmos more pronounced on the right side, perspiration, agitation and tremor. The progress of the case is shown on chart 4, and it can be seen that three separate attempts were made to resume thiouracil therapy after a drop in the white count, with a drop at the last attempt to 2,200 white cells and 38 per cent polymorphonuclears. At no time was there any other warning of bone marrow depression, and the patient never stopped work as a nurse on night duty in this hospital.

CASE 5.—B. A., a woman aged 50, was admitted to the hospital with a history of nervousness, palpitation, profuse sweating, and loss of 21 pounds (9.5 Kg.) in two years. Enlargement of the thyroid was noted a few months before admission. The

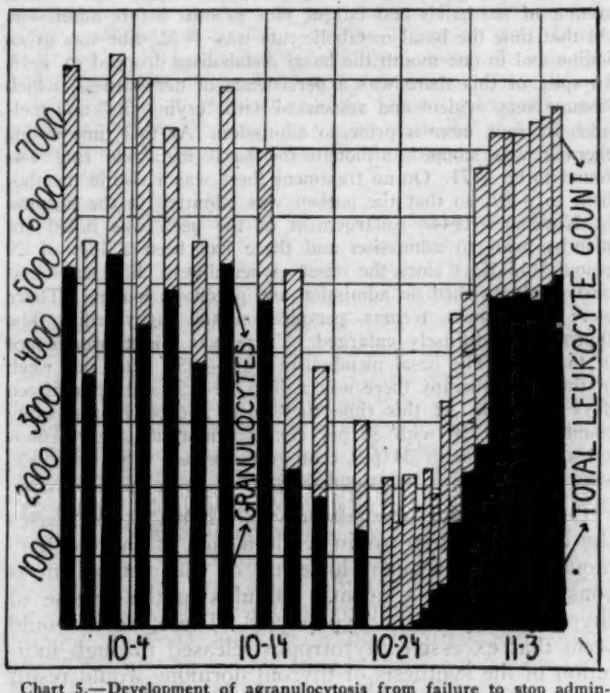

Chart 5.—Development of agranulocytosis from failure to stop administration of thiouracil.

patient had been given Lugol's solution but had taken none for nine months prior to admission. Examination revealed agitation, excess sweating, tachycardia and enlargement of the thyroid gland. The basal metabolic rate was + 53. Thiouracil 1.2 Gm. was given for three days and then reduced to 0.8 Gm. After

2. The pathologic report on the thyroids in these 3 cases stated that they were well within the range of variation for a larger group of hyperthyroidism specimens.

four weeks of hospitalization the basal metabolic rate dropped to +23. There was a gain of 11 pounds (5 Kg.) in weight. She was discharged from the hospital and treated as an ambulatory patient. On October 16 her basal metabolic rate was +19, but the white blood count had fallen. She complained of a sore throat, had a temperature of 104 F. and after a sternal puncture was made she was readmitted to the hospital. Sternal puncture revealed a normocellular marrow with slightly decreased myelocytes and myeloblasts, and a pronounced decrease in polymorphonuclear leukocytes, many very young red cells and platelets in abundance. Findings were typical of a maturation arrest in granulocytes. Chart 5 shows the drop in the total leukocytes with disappearance of granulocytes. We were unable to find any thiouracil chemically in the bone marrow, though a control normal marrow to which thiouracil had been added was positive. Twenty thousand units of penicillin was given intramuscularly every three hours. In addition, 6 Gm. of liver fraction L [3] was given orally daily, and a transfusion of 400 cc. of blood was administered. After three days the temperature fell to normal and as soon as the white count was normal the patient was discharged on the eleventh day. She is now being treated with Lugol's solution.

Case 6.—D. M., a woman aged 18, for three months, following appendectomy, had suffered from palpitation, nervousness, loss of weight, perspiration, diarrhea and slight prominence of the eyes. The basal metabolic rate was +41. Thiouracil was given, 0.4 Gm. three times a day for two days and then reduced to 0.2 Gm. three times a day. On Oct. 20, 1944 there was a sudden onset of rash and fever of 103.5 F. with pains in the legs and swelling of the lymph nodes. Medication was stopped and an outside physician diagnosed a scarlatinal rash and administered sulfonamide drugs. The fever subsided in twenty-four hours and the rash in two days. On October 27 the patient telephoned that after two doses of 0.2 Gm. the same aches and pains and rash appeared, with a temperature of 101.5 F., which disappeared in twenty-four hours after stopping medication.

Case 7.—D. T., a woman aged 27, first noted nervousness, tremor of the hands and fatigue nine months before admission. At that time the basal metabolic rate was +32. She was given iodine and in one month the basal metabolism dropped to +18. In spite of this there was a persistence of nervousness, which became very evident and associated with "crying fits" and melancholia four months prior to admission. At this time iodine therapy was stopped, although the basal metabolic rate was found to be +71. On no treatment there was a rise in metabolism to +81, so that the patient was admitted to the hospital in November 1944. Enlargement of the neck was noted six months prior to admission and there had been a loss of 29 pounds (13 Kg.) since the onset of her illness. She was obviously malnourished on admission and psychotic looking. There were nervousness, tremor, perspiration and tachycardia. The thyroid was diffusely enlarged. There was slight prominence of the eyes. The basal metabolism was +85. After one week of thiouracil therapy there was a drop to +57 and after fifteen days to +48. At this time there was a drop in the white count from 6,750 with 50 per cent polymorphonuclear leukocytes to 4,000 with 34 per cent granulocytes. The drug was stopped because of the granulopenia.

On theoretical grounds, thyroid hormone decreases the output of thyrotropin while a lack of thyroid hormone or a consequent lowering of the metabolism is considered to be a normal stimulus to the release of thyrotropin from the hypophysis. Therefore it would seem that excessive thyrotropin released through inhibition of the synthesis of thyroid hormone would result in exophthalmos or an exacerbation of that already present. Contrary to certain other observations, we found that exophthalmos never appeared in any case in which it was not present at the start of therapy and was, when present, not exacerbated by thiouracil. In the following 2 cases of malignant exophthalmos 1, in which thyroid and pituitary irradiation also were given, was unchanged, while the other, as a control, in which no therapy other than thiouracil was given, showed much improvement as demonstrated by the exophthalmometric measurements.

Case 8.—C. K., a man aged 24, a truck driver, was admitted to the hospital in 1940 when a thyroidectomy was performed because of nervousness, loss of weight, perspiration, weakness, diarrhea and progressive prominence of the eyes. The basal metabolic rate was +50. Cholesterol was 125 mg. per hundred cubic centimeters. The pathologic report showed diffuse hyperplasia of the thyroid. On discharge, with the exception of slight tremor and exophthalmos, the symptoms and signs of hyperthyroidism had disappeared and there was a gain in weight of 8 pounds (3.6 Kg.). The basal metabolic rate was 0. In January 1941 the patient was readmitted because of a progressive return of the original symptoms, with loss of 17 pounds (7.7 Kg.) and an abscess in the scar, which was incised and drained. Examination at the time revealed hyperthyroidism with tachycardia of 110, diffuse swelling in the region of the thyroid, and a basal metabolic rate of +45. On Lugol's solution the basal metabolic rate dropped to —5. The thyroid region was explored, but no hyperplastic thyroid tissue was found. The swelling noted clinically was due to induration and fibrosis of the muscles and tissues of the neck. The symptoms then decreased but did not disappear. He was again admitted in August 1944 complaining of nervousness, loss of 40 pounds (18 Kg.), severe exophthalmos and enlargement of the neck. The basal metabolic rate was +45 on admission, with cholesterol of 150 mg. per hundred cubic centimeters and blood sugar of 76 mg. per hundred cubic centimeters. Thiouracil therapy was instituted with a dose of 1 Gm. per day for seven days then reduced to 0.6 Gm. In spite of the severe exophthalmos, as a control for the next case, no thyroid or pituitary irradiation was given. The basal metabolic rate was reduced to +5 in two weeks. There was a gain of 5 pounds (2.3 Kg.) and cessation of nervousness, tremor, palpitation and tachycardia. He was discharged on a dose of 0.3 Gm. This was continued for two weeks and the patient returned to work, the medication stopped. After one month without medication, the basal metabolic rate remained at —3 and there was a gain of 17 pounds (7.7 Kg.) in weight. There was evident recession in the prominence of the eyes. On admission the exophthalmometric reading was right eye 28 mm., left eye 30 mm. On discharge it was right eye 24 mm., left eye 26 mm.

Case 9.—S. C., a man aged 27, had a thyroidectomy performed three and one-half years before the present admission because of tremor, nervousness, palpitation, loss of weight, enlargement of the thyroid and exophthalmos of six months' duration. Following this he received 10 minims (0.6 cc.) of Lugol's solution, three times a day for three years. The patient remained in good health with the exception of persistent and pronounced exophthalmos. Six months prior to admission Lugol's solution was stopped and he promptly noted a recurrence of his symptoms. In the two months prior to admission, tremor and nervousness became very noticeable and he had frequent attacks of diarrhea. There was a loss of 20 pounds (9 Kg.) in this short period. A point of unusual interest is the occurrence of a rare symmetrical skin lesion in the legs which, clinically and on biopsy, proved to be localized myxedema. On admission the patient, with effort, was almost able to express both eyeballs from their sockets. The basal metabolic rate on June 27 was +30 and on July 3 was +32. The cholesterol on three occasions was 144, 140 and 138 mg. per hundred cubic centimeters, with blood sugar of 79, 78 and 70 mg. per hundred cubic centimeters. One Gm. of thiouracil was given daily over a period of ten days, following which the dose was reduced to 0.5 Gm. until discharge. The patient was ambulatory and received no sedation. Because of the severity of the exophthalmos, 0.03 Gm. of thyroid was given twice daily and pituitary irradiation every three days. On admission, exophthalmometric readings were right eye 31 mm., left eye 33 mm. and on discharge right eye 30 mm., left eye 31 mm., showing no increase in exophthalmos. The basal metabolic rate fell progressively to +2, and there was a gain of 5¼ pounds (2.4 Kg.) and disappearance of all symptoms of hyperthyroidism at the end of the twenty-fourth day hospital stay. There was no change in the localized myxedema of the extremities.

3. Courtesy of the Winthrop Chemical Company.

The two cases just presented would seem to indicate that even malignant exophthalmos is no contraindication to the use of this form of therapy.

A third case of recurrent hyperthyroidism is presented:

CASE 10.—S. T., a woman aged 35, married, had a thyroidectomy performed in October 1943 for thyrotoxicosis, as evidenced by enlargement of the gland, perspiration, exophthalmos and a basal metabolic rate of + 59. The pathologic report was thyroid hyperplasia. The postoperative course was uneventful and the symptoms and signs of the disease abated. Three months later all the previously mentioned symptoms had returned. Bilateral exophthalmos was present, more pronounced on the right side. The basal metabolic rate on June 16 was + 51. Cholesterol 150 mg. per hundred cubic centimeters, blood sugar 80 mg. per hundred cubic centimeters. The patient was given 1 Gm. of thiouracil daily for four days, then reduced to 0.6 Gm. until discharge. Within a week the patient stated that she was feeling less nervous. The symptoms gradually disappeared and there was a striking decrease in the size of the thyroid gland and a recession of the exophthalmos to the point where the eyes were no longer at all prominent. There was a gain in weight of 7 pounds (3.2 Kg.) and a fall in the basal metabolic rate from + 51 to — 3 in the thirty days of hospitalization. We had admitted the patient for a second thyroidectomy to compare our pathologic specimens but found the second operation superfluous. The patient has remained symptom free with a basal metabolic rate of + 9 on August 10, + 2 on August 24 and + 7 on September 7, on a maintenance dose of one 1 Gm. tablet every three days.

Thiouracil seemed to yield an excellent result in these cases of recurrent hyperthyroidism. In 2 cases there was palpable thyroid tissue, but in the third none could be found in the second operation. In some cases no definite thyroid tissue can be felt or found at operation. In these, as in the cases of deep substernal thyroid, use of thiouracil in the absence of intolerance is unquestionably the procedure of choice.

Thyrocardiac disease is the result of the increased circulatory demands on the heart due to the heightened basal metabolic rate and imposed on heart muscle whose metabolism has itself been altered like all other body tissues by thyrotoxicosis.

CASE 11.—M. P., a woman aged 38, married, was seen by an ophthalmologist five years before admission because of prominence of one eye, for which Lugol's solution was prescribed. There were complaints of nervousness, but the patient took Lugol's solution daily for four and one half years. Four months prior to admission she stopped taking this medication and began to lose weight. There were tremor, shortness of breath, perspiration and enlargement of the thyroid. There was no history of rheumatic fever. Examination revealed bilateral exophthalmos, an enlarged, somewhat nodular thyroid, the neck veins were engorged, and there was tachycardia, 140-150 per minute, with a heaving apical impulse. There was a systolic murmur at the apex, but no diastolic murmur could be heard at this time. There were rales at the base of both lungs. The liver was palpable five fingerbreadths below the costal margin. The spleen was palpable. On a dehydration regimen with digitalis therapy the signs of congestive heart failure decreased very slowly. Two days after admission a small amount of fluid was removed from the right pleural cavity. Five days after admission there was sufficient improvement to allow a basal metabolic rate determination, which was + 60. Cholesterol was 110 mg. per hundred cubic centimeters. At this time a definite diastolic murmur was heard at the apex and the cardiac contour revealed a general enlargement of the heart with prominence of the pulmonary conus. With barium in the esophagus a posterior displacement by an enlarged left auricle was noted. These findings, in addition to the later finding of elevation of the left bronchus, indicated the presence of mitral stenosis and insufficiency on a rheumatic basis associated with hyperthyroidism. It was the opinion of the observers that the patient had rheumatic heart disease and cardiac failure precipitated by the occurrence of hyperthyroidism. On July 22, ten days after admission, thiouracil therapy was begun with a dosage of 1 Gm. daily. This was continued for nine days and then reduced to 0.6 Gm. daily for eighteen days. During this time the subjective improvement was striking. Digitalis was stopped. The basal metabolic rate dropped to + 46 and then to + 35. There it remained at a fairly constant level for three weeks, during which time the dose of thiouracil was increased to 0.8 Gm. and then to 1.2 Gm. On September 8, fifty-four days after admission, the basal metabolic rate had dropped to + 30. There was no recurrence of congestive failure with the patient off digitalis during the last four weeks. Since there was a complete cessation of excessive perspiration, tremor, and a gain of 16 pounds (7.3 Kg.) with a normal pulse rate, the patient was discharged on a dose of 0.6 Gm. On October 16 the basal metabolic rate was + 10, the dose was reduced to 0.2 Gm., and on October 30 the basal metabolic rate was + 11.

CASE 12.—R. R., a woman aged 57, admitted with a history of nervousness, palpitation, profuse sweating and loss of 19 pounds (8.6 Kg.) in three years, with enlargement of the thyroid of several months' duration, had not been given Lugol's solution for five months prior to admission. The basal metabolic rate was + 55. The patient was given 1.2 Gm. of thiouracil for three days, the dose then being reduced to 0.8 Gm. for most of her hospital stay. There were attacks of palpitation during severe bouts of paroxysmal auricular fibrillation several times a day, lasting from one to two hours and causing the patient considerable distress. At the end of the first week the attacks of palpitation were found to be due to auricular tachycardia; there were no further attacks of paroxysmal auricular fibrillation. In addition, these attacks of tachycardia occurred less frequently. By the twelfth day they had disappeared completely and were replaced by extrasystoles. The patient still felt palpitation, but this was not as troublesome. At the end of the third week the extrasystoles were no longer present. During four weeks of hospitalization the basal metabolic rate was reduced to + 29. Signs of hyperthyroidism and the attacks of palpitation had disappeared and the patient gained 8 pounds (3.6 Kg.). After discharge the patient attended the follow-up clinic and on a dose of 0.6 Gm. daily the basal metabolic rate fell to + 16.

Since thyroid disease is one of the reversible types of heart disease, the toxic effect on the heart disappears with control of the hyperthyroidism. In case 1, as a result of thyrotoxicosis, circulatory failure was precipitated in a patient with mitral stenosis; as the thyrotoxicosis was controlled the patient improved, so that there was no recurrence of circulatory failure with physical activity for a period of weeks. In case 2 the gradually disappearing toxic effect was shown by the transition from attacks of auricular fibrillation to extrasystoles and finally a reversion to normal rhythm rate. The same result was obtained in both these cases that could have been accomplished by surgery, without the risks of thyroidectomy in cases of this type. In the first case there was some refractoriness to the drug; in the second the results were quite rapid. It is our opinion that as long as some improvement occurs thiouracil therapy should be continued, since some cases may be more refractory than others. In case 1, after the basal metabolic rate leveled off at + 40 after four weeks, it was suggested that no further result could be expected, but since the patient was doing well we persisted in using thiouracil therapy with ultimate success after eight weeks. This refractoriness of cardiac patients has been previously noted. It is of interest that there were no electrocardiographic changes in these or any other cases which could be attributed to direct action of thiouracil on the heart muscle.

There is some clinical evidence that the amount of diabetes, when present in patients with thyrotoxicosis, is a direct function of the basal metabolic rate. Total thyroidectomy ameliorates the coexisting diabetes. In Means's patient it was observed that as long as by withdrawal of thyroid she was allowed to remain myxedematous there was considerable lessening of her diabetes, but as soon as thyroid was administered her diabetes became intensified; when fully myxedematous she had no diabetes. The following 2 cases constitute a physiologic experiment of the same nature in reverse where, through administration and withdrawal of thiouracil, we were able to vary the intensity of the diabetes as measured by the insulin requirement. It would scarcely be possible to postulate the existence of a specific thyroid antagonism between the hormones of the pancreas and the thyroid, because the amount of diabetes may simply be the result of the decreased basal metabolic rate brought about by thiouracil.

CASE 13.—E. R., a woman aged 55, was admitted with a history of diabetes of five years' duration which had been

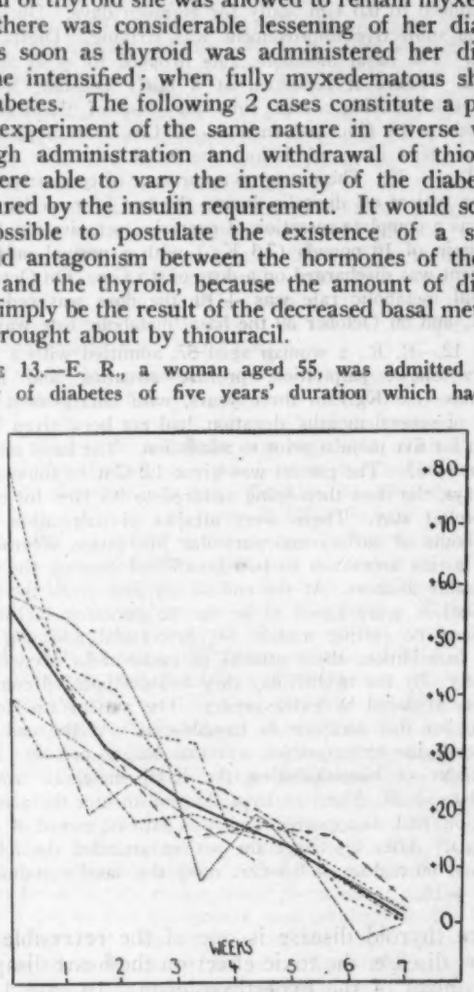

Chart 6.—A composite of the drop in the basal metabolic rate in first 8 cases treated with thiouracil. Average curves, the heavy black line, shows a drop of 1 unit in the basal metabolic rate per day.

controlled with diet and 60 units of protamine insulin daily. Enlargement of the thyroid gland was noted two years prior to admission. For several months she had complained of nervousness, weakness and loss of 15 pounds (6.8 Kg.). The diabetes was noted shortly after the menopause. Examination revealed agitation, slight stare, enlarged nodular thyroid and no tremor. The basal metabolic rate was + 40, the blood pressure 210/90, tachycardia 110 per minute. The urine contained 4 + sugar and traces of acetone. Blood sugar was 220 mg. per hundred cubic centimeters, cholesterol 256 mg. per hundred cubic centimeters. The patient was placed on a diet of carbohydrate 250, protein 80, fat 80, with 60 units of protamine zinc insulin daily. The urine became acetone free with 3 + to 4 + sugar. Four days after admission, thiouracil therapy was inaugurated with a dose of 1 Gm. daily for three days, which was then reduced to 0.6 Gm. until discharge. The basal metabolic rate gradually dropped over a period of two weeks to + 15, at which level it remained. There was general improvement in the diabetic status, so that with a constant diet the insulin was withdrawn by degrees until the patient received no insulin at all. The urine showed 1 + sugar with no acetone. The basal metabolic rate two months after discharge was + 12. There was a gain in weight of 6¾ pounds (3 Kg.). The subjective improvement in this patient was remarkable. Her family stated that she was a changed woman, no longer irritable but transformed into an energetic and useful woman. Objectively, all signs of hyperthyroidism had disappeared at discharge.

CASE 14.—E. K., a woman aged 55, weight 116 pounds (52 Kg.), was admitted November 15 with complaints of infection of the left leg of three weeks' duration. There was increased perspiration, swelling of the neck of one week's duration, nervousness, insomnia and loss of weight of 80 pounds (36 Kg.) in fifteen years. In addition, she had developed an infection of the left leg of three weeks' duration. She had had diabetes for thirteen years, of late controlled by 25 units of protamine zinc insulin and 15 units of regular insulin daily. The basal metabolic rate was + 33. The thyroid was enlarged, with a nodule in the left lobe. A systolic murmur could be heard over the precordium. The blood pressure was 190/90. The patient was placed on thiouracil 1 Gm. daily for three days, then reduced to 0.8 Gm. daily. After six days of thiouracil therapy her basal metabolism had dropped to + 18. At the end of ten days the regular insulin was stopped. Two days later the protamine was cut to 15 units, and at the end of two weeks all insulin was stopped. She is now under good diabetic control, on a diet of carbohydrate 250, protein 80, fat 80, with no insulin. The blood sugar is 183, with moderate glycosuria and no acetonuria.

It is well known that diabetes associated with hyperthyroidism is difficult to control. Improvement in the diabetic status goes hand in hand with improvement in the thyroid status. This has been frequently demonstrated by thyroidectomy and iodine. As would be expected, thiouracil yields similar results. As in cardiac patients, it would seem preferable to accomplish such a result by medical rather than surgical means, since the risks of anesthesia and operation can be avoided.

In our series of 96 cases of thyrotoxicosis treated with thiouracil, there were only 4 in which the drop in basal metabolic rate could not be fitted into the limits of the curve shown in chart 6. These were four severely ill thyrocardiac patients and the drop was distinct but the rate was slower. The median curve (heavy black line) shows a drop of 50 units in seven weeks. A rough rule may therefore be predicated that the basal metabolic rate will drop to zero in as many days as the height of the basal metabolic rate just before administering thiouracil. When medication had to be discontinued because of toxic effects of the drug, the fall in basal metabolic rate took place at the average rate up to the time of discontinuance of the thiouracil. Sixteen per cent of our patients are in sustained remission with no medication whatever for periods ranging from over two months to fifteen months after discontinuance of the drug. In 20 per cent thiouracil had to be discontinued because of sensitivity, and 9 of these were submitted to surgery without any untoward finding at operation. In fact, this drug is an excellent means of securing the lowering of the basal metabolic rate requisite for operation without necessitating any preliminary period of rest. There are 25 cases (26 per cent) in which the basal metabolic rate rises as soon as the maintenance dosage is lower than 0.2 Gm. daily. These have blood counts every three weeks, as outlined.

We have noticed an excellent response to the drug in young people who have had no previous treatment with iodine. The drop in basal metabolic rate is very rapid and the fall sustained. It is our opinion that thiouracil will find a wide field of application in these "fresh" cases as they occur.

CONCLUSION

Our results would seem to indicate that thiouracil will bring about a drop in the basal metabolic rate in all patients suffering from hyperthyroidism. It has, how-

ever, serious toxic effects and the patient must be kept under continuous medical observation so that the drug may be promptly discontinued and further injury to the patient prevented. The precautions to be observed are very similar to those employed for the careful administration of sulfonamide drugs. However, examination of the red blood cells is not necessary, as no injury to the erythrocytes has been noted. The main danger is agranulocytosis, and since we have noted a definite and sudden granulopenia in 20 per cent of our patients, it is apparent that a white blood count must be done every second or third day, and the drug must be stopped instantly if there is a sudden drop in the total leukocyte count, or if the granulocytes drop below 45 per cent. If there is a sudden rise in temperature, accompanied by arthralgia, myalgia, lymphadenopathy or the appearance of a rash, the drug must be discontinued. It is well to instruct the patient to inform any physician called in of the medication being taken so that sulfonamide drugs or other compounds containing the benzene ring are not prescribed. The patient should be given only two or three days' supply, just enough to last until the next blood count. Since this drop in the white count can occur with disconcerting suddenness at any time, it is doubtful whether thiouracil is as yet ready for long continued use in routine medical practice, until some method of protecting the bone marrow is perfected. The use of pyridoxine, vitamin B_6, in prophylactic doses of 150 mg. daily by mouth, or 200 mg. intravenously where a severe drop in the leukocyte count has taken place, seems at present to be most promising.

HERNIATION OF FASCIAL FAT AS A CAUSE OF LOW BACK PAIN

WITH RELIEF BY SURGERY IN SIX CASES

RALPH HERZ, M.D.
CLEVELAND

Eight years ago (1937) I observed a patient suffering from excruciating low back pain so severe that she was unable to get out of bed. Examination revealed a small tumor in the left sacroiliac region; pressure on this tumor intensified the pain. A biopsy was suggested, but the patient refused to have it done. Injection of 1 per cent aqueous procaine solution around the tumor gave temporary relief. Since then the patient has had periodic attacks of the same type of pain, necessitating bed rest. Injections of metycaine, strapping and physical therapy produced temporary relief.

In October 1943 another patient, also a woman, was seen because of acute low back pain, and she also displayed a small palpable mass over the right side of the sacrum, which was extremely tender and painful. Circuminjection with 2 per cent metycaine gave immediate relief. The patient had a history of "lumbago" of several years' duration. Often when she stooped she could not rise unaided, and during acute exacerbations she could not turn in bed. The patient agreed to a biopsy. On cutting down on the tumor, no demarcation was present, and it could not be differentiated from surrounding fatty tissue. Nevertheless, a wide dissection of fat was made in this area. When the patient emerged from anesthesia she volunteered the information that the pain in her back had disappeared, and she has remained free from it ever since.

This excellent clinical result was impossible to explain on the basis of any previous knowledge or experience. The pathologist's report was not enlightening. The specimen consisted of two similar lobulated masses of fat, roughly round and measuring 5 cm. in diameter. Sections showed homogeneous yellow fat, slightly lobulated. Around one surface there was a partial covering of loose but tough grayish brown fibrous connective tissue, apparently the seat of edema and hemorrhage. Microscopically there were lobulated groups of mature adipose cells separated by dense bands of fibrous connective tissue. In some places the latter showed edema and focal hemorrhage. The tissue was consistent with a pathologic diagnosis of fibrolipoma.

Within the next year 2 more women were seen with similar symptoms and similar painful, palpable masses. They also were subjected to surgical excision of the fatty tumor and experienced similar striking relief.

These first 3 patients who were operated on were all somewhat obese, and it was difficult in all to differentiate the mass from surrounding fatty tissue. Nevertheless excision of fatty tissue in the painful area afforded complete and immediate relief from the back pain.

The literature and anatomy textbooks were searched for an adequate explanation of the clinical results, but none was found until the article by Copeman and Ackerman [1] appeared. They reported 10 similar cases (all in men in the armed services) in which fatty tumors were excised, with striking relief. They also reported an anatomic study on 14 normal backs and showed that the palpable masses which are the seats of pain are herniations of fascial fat.

Since I have studied their report, I have operated on 3 additional patients, and the lesions undoubtedly are the herniations these authors described. In 1 patient the lobule of fat was discernible as soon as the incision was made (case 4).

ANATOMIC CONSIDERATIONS

Since the concept advanced by Copeman and Ackerman to explain the trigger points or "tender rheumatic nodules" of so-called fibrositis of the back offers an explanation for a condition whose etiology has been obscure, it seems worth while to present their findings in considerable detail.

The pain generally originates in certain focal points, from which more generalized subjective pain is referred segmentally. This referred pain may be at a considerable distance from its real origin, as in many cases of sciatica, in which the original focal point is in the lumbar or gluteal muscles. When these points are found by the palpating finger, the patient winces involuntarily. Pressure of the same intensity only a few millimeters away will not produce the same response. Pain referred to other areas from such a point will also generally be reproduced by this pressure. These trigger points tend to occur in certain predictable sites in the lumbar and gluteal areas and also throughout most of the dorsal area.

In the lumbar region the most common sites are at the edge of the sacrospinalis muscle just above the iliac crest, 1 inch above this level, and at the level at which the latissimus dorsi crosses the sacrospinalis. In the gluteal region points may be found all along the

Dr. Normand L. Hoerr, professor of anatomy, Western Reserve University School of Medicine, saw several of these patients before and after operation and discussed the findings during the investigation. Dr. Simon Koletzky of the Department of Pathology made the pathologic study of tissue removed at the operations.

1. Copeman, W. S. C., and Ackerman, W. L.: "Fibrositis" of the Back, Quart. J. Med. **13**: 37-51 (April-July) 1944.

crest of the ilium and for a distance of about 2 inches below it; also along the sacroiliac junction, where the deep fascia is attached. They are not commonly found elsewhere in the buttock.

Copeman and Ackerman dissected 14 backs, with special attention to areas which are the commonest sites of pain in so-called fibrositis. After one or two dissections their preconceived ideas of the importance of fibrous tissue were modified, as no fibrous lesions, abnormalities or adhesions were found at a deeper level than the subcutaneous tissues; and moreover it became obvious that the basic fat pattern, which persisted in even the most cachectic bodies, corresponded exactly with the pain patterns previously charted. Increasing attention was therefore paid in subsequent dissections to relationships of this fat and the fibrous tissues.

Beneath the subcutaneous fat and areolar tissue lies the highly vascular superficial fascia, which forms a continuous sheet from the neck to the gluteal region. Space between this and the deep fascia is principally potential, containing little or no fat. In certain well defined places, however, deposits of pinkish fat constantly occur. These, with equally constant deep areas, constitute the basic fat pattern. In obese persons this fat pattern tends to be obscured by more generalized deposition of fat. The fascias are not of uniform thickness, being notably thinner in certain places, and frequently there are actual deficiencies in the fascial membranes. In these places the underlying fat tends to bulge through, sometimes resulting in a complete herniation (fat hernia).

Detailed examination of synovial sheaths of all tendons and joints showed that they consist largely of rather fibrous fat, which forms a loose tunnel through which the tendon moves. As tendons are avascular and their microscopic structure does not suggest that they can readily become edematous owing to the dense nature of their constituent fibrous tissue, it is suggested that it is this investing fatty capsule which becomes edematous, thus narrowing the lumen of the tendon sheath and impeding its action, causing stiffness, which may ultimately lead to cessation of voluntary movement on account of pain.

In the lumbar region the sacrospinalis muscle is edged with fat, some lying superficial to the deep fascia (lumbar fat pad) and some lying within the angle made by the deep fascia as it splits to invest this muscle. In very wasted bodies this fat is deficient along the upper portion, where it lies under cover of the latissimus dorsi muscle. Below this strip the fat follows the line of attachment of the deep fascia and the muscle along the sacroiliac junction. Small fat hernias have frequently been observed in both these areas.

Although a majority of trigger points of pain in clinical subjects occurred at certain levels, these varied by about ½ inch on their horizontal plane. Dissection showed that this is due to variation in width of the sacrospinalis muscle according to muscular development. In the vertical plane, levels at which trigger points cluster most thickly are at the junction of the outer border of the sacrospinalis with the iliac crest 1-1½ inches above the crest, and 2-2½ inches above. Careful dissection at these areas, through the basic fat pad which lies in the superficial fascia, revealed that at these points the cutaneous branches of the posterior primary rami of the first three lumbar nerves pierce the deep fascia after leaving the body of the muscle. This they do through definite foramens accompanied by small blood vessels. There is a small horizontal fold of membrane, overhanging each foramen, which probably acts as a valve and prevents herniation of fat when the back is flexed. It is believed that these valves do not always perform this function efficiently, and failure to do so allows herniation to occur; this may result in lumbago.

It is not uncommon to find at intervals along the edge of the muscle small bubbles of deep fascia containing a few lobules of fat bulging up from the angle in which it is contained, and firm pressure can easily convert it into a true fat hernia. These small hernias tend to occur at points where the fascia is weak and do not give rise to symptoms until some incident, such as sudden trauma or some pyrexial illness which entails lying on the back for several days produces an increase in the fat pressure and a painful degree of distention. This leads to edema, which may perpetuate the condition.

In the gluteal region there is a crescent of pink fat, extending along the crest of the ilium and for about 2 inches below. It is contained within the superficial fascia and extends from the anterior superior spine back to the sacroiliac junction, often sending a narrow prolongation down this area. A similar tongue of fat lies in this region, but at a deeper level, being contained in the angle of the deep fascia. It is thus continuous with the fat along the edge of the sacrospinalis muscle in the lumbar region.

The fat along the iliac crest lies in layers, where it has split the superficial fascia in which it is contained, and it is common for lobules of one layer to herniate into a more superficial layer, or laterally into an adjoining compartment, where the fibrous walls are weak or deficient. The fact that this pad of fat lies almost directly over the unyielding bone of the ilium may account for the common occurrence of such lesions in this area.

PATHOLOGIC CONSIDERATIONS

The anatomic study by Copeman and Ackerman showed that trigger points of pain in the back apparently have a topographic relationship to the basic fat pattern. Herniation of fat lobules through fascial weaknesses, deficiencies or foramens was found in dissection, and such herniations were proved to be sites of pain in living patients. They differentiate three types of fat hernias: nonpedunculated, pedunculated and foraminal.

Fat which lies under a fascial covering, as in the angle of the deep fascia where it splits to invest the sacrospinalis muscle, or along the crest of the ilium, is always under tension and so will bulge into any potential hernial space, as the result either of congenital weakness or of trauma. This tendency will be increased by muscular action. Such potential hernias probably should not be considered pathologic unless they cause congestion and pain by constriction of enclosed fat. In this case edema and hemorrhage may have occurred which, by increasing the tension, initiate a vicious circle and so in time tend to make the condition chronic. In microscopic sections from biopsy specimens some degree of commencing fibrosis has also been seen, suggesting that if such a hernia is subjected to chronic "strangulation" for a sufficiently long period it might be converted into a true fibrous nodule, though this has not been observed.

Nonpedunculated hernias were most commonly found in the lumbar fat pad, lying within the superficial fascia and in its extension downward along the crest of the ilium, in the gluteal region. These tense swollen fat nodules were palpable when sufficiently superficial. A

variant of this type is that which protrudes in a horizontal direction, the contents of one fibrous compartment herniating through an imperfection in the wall of the neighboring compartment as the result of some extra tension; this type occurred most frequently along the iliac crest.

The authors found no instance of pedunculated hernias in normal backs dissected, but several were found and removed in patients subjected to operation. In each of these cases there was sudden onset of pain produced by a strain several years previously. Hence it is thought that this type probably is a late result of strangulation in a hernia originally of the nonpedunculated type. The appearance is similar to that of an ordinary pedunculated polyp, but a lobule of fat replaces the terminal polypoid tissue. This polyp lies in a layer of fat more superficial than that from which it springs, being connected with its roots by a pedicle which generally contains fibrous tissue and a blood vessel. The pedicle sometimes appears to be twisted. Histologically there is generally some fibrous tissue merging into the terminal fat of the lobule.

Copeman and Ackerman also report a foraminal type of hernia found only along the edges of the sacrospinalis muscles, supplied by the lumbar nerves, in the first, second and third of which the lateral branches of the posterior rami become cutaneous and pierce the deep fascia at the spots where trigger points of pain chiefly occur. In several cases a herniation of this type was found to be the cause of sudden lumbago, and removal of the edematous fat and enlargement of the foramen proved curative.

Of the 6 cases presented in this report, not one of the foraminal type was seen, and only one of the fat lobules removed had a discernible pedicle. Histologic findings were similar to those described by Copeman and Ackerman. They report that microscopically the nodules removed at operation consisted principally of fatty tissue with young cellular fibrous tissue growing into it. The blood vessels were congested and their walls thickened, with perivascular proliferation. There were also in some nodules occasional patches of older fibrous tissue. In 1 case there were lobulated groups of mature adipose cells separated by dense bands of fibrous connective tissue, which in some places exhibited edema and focal hemorrhage. In 1 (case 6) nerve tissue was found in the fat lobule, with edema and focal hemorrhage. In other cases the specimen consisted only of fat tissue showing edema and hemorrhage.

CLINICAL CONSIDERATIONS

In all 6 cases in this series there was a history of trauma due to strain which had initiated the pain. Pain in the back was extremely severe in all and in some instances was referred down one leg. Two patients had had recurrent attacks of acute lumbago for fifteen years which had been incapacitating and required bed rest. One could not turn in bed during these exacerbations. In all cases a definite mass was palpable which was extremely tender and pressure on it intensified the pain. Injection of these masses with procaine or metycaine solution provided temporary relief in all instances. In 1 instance the condition was bilateral, although the symptoms were more severe on one side.

Important diagnostic features are the severity of the pain, the frequency of radiating pain down the leg, the presence of a palpable tender mass which is a "trigger point" of the pain, which can be relieved temporarily by injection with anesthetic solution. This condition may be present with other diseases, such as pelvic disorders, to which the back pain may be erroneously attributed. One patient in this series had had fibromyomas of the uterus for which hysterectomy had been performed, but severe attacks of back pain had continued and had not been relieved until the fascial fat hernia was removed.

It is my impression that some, and perhaps many, of the cases of so-called functional back pain, which is considered to be psychogenic, may be due to fascial fat hernias. Whenever one makes a search for psychic disturbances they are quite easy to find in almost any patient, but my experience convinces me that they are seldom, if ever, the cause of excruciating pain in the back.

From a surgical standpoint, removal of the palpable fat mass presents some difficulty, especially when there is considerable superficial fatty tissue. In the first case in which operation was performed, a wide dissection of fat in the painful area relieved the pain immediately and permanently. In subsequent operations the palpable mass was transfixed with needles before the incision was made, a procedure which Copeman and Ackerman also used. In the first 3 cases in this series it was not possible to see a definite mass that could be clearly differentiated as the palpable nodule. As already mentioned, these patients were relatively obese women, which undoubtedly accounts for at least part of the difficulty. It was also occasioned by a lack of knowledge as to the type of lesion being sought. In the fourth operation, on dividing the superficial fat and retracting the edges of the wound a fat tumor popped into the wound. In this and the subsequent instances, operations were performed with more assurance, since it was known that the lesion would be a lobule of fat, as proved by the three previous operations and the elucidation of the condition in the article by Copeman and Ackerman.

COMMENT

Since all the patients so far operated on were women, I thought at first that perhaps the condition was confined to females or at least more prevalent in them. However, all 10 cases reported by Copeman and Ackerman were in men. Recently I saw a man with severe lumbago who had several palpable nodules that were trigger points of pain; injection of these with metycaine solution has provided temporary relief. It would seem that in civilian practice the condition may possibly be more prevalent in women, since with their inferior muscular development a less severe strain may cause herniation of fascial fat. It also seems likely that the lesion may be more difficult to discern at operation in women because of their greater superficial fat padding.

In these 6 cases fairly wide dissection of fat in the painful area has relieved the pain, whether or not the herniation could be clearly delineated. One or more lobules of fat were removed in all the cases reported by Copeman and Ackerman. They also describe a technic which they call "teasing" the nodule which produces more lasting results than ordinary injections.

REPORT OF CASES

CASE 1.—A married woman aged 30 had had recurrent symptoms of lumbago for fifteen years. She always had to be careful when she stooped or lay down, for she was prone to get a "catch" in her right leg and would have to have some one pull her to an upright position. She had noticed a minute tumor over the right sacral region, which she thought had been present throughout the period in which she had had diffi-

culty with her back. Examination revealed a small mass over the right side of the sacrum. Circuminjection with procaine solution afforded temporary relief from the pain.

At operation a transverse incision was made over the fifth right lumbar area and carried down through the subcutaneous tissues. Bleeding points were clamped and ligated with plain number 1 catgut. A firm nodule and its surrounding tissues were widely excised. Comparatively little bleeding was encountered. The skin was closed with silk sutures.

The pathologist's report on the tissue removed was that it consisted of two similar lobulated masses of fat, roughly round and measuring 5 cm. in diameter. Sections showed homogeneous yellow, slightly lobulated fat. Around one surface was a partial covering of loose but tough grayish brown fibrous connective tissue which appeared to be the seat of edema and hemorrhage. Microscopic examination showed lobulated groups of mature adipose cells separated by dense bands of fibrous connective tissue. In some places the latter showed edema and focal hemorrhage. The tissue was consistent with a clinical diagnosis of fibrolipoma.

As soon as the patient recovered from the anesthetic she remarked that the pain in her back and leg was gone, and she has been entirely free from it since operation, eighteen months ago.

Case 2.—A woman aged 67 sought medical attention because of a severe pain in the back which had appeared as she was getting out of bed; she had had similar attacks before. At examination a painful nodule was discovered in the right sacroiliac region; this was relieved with injection of 2 per cent procaine solution. Before operation the painful tumor was transfixed with two needles. An incision about 3 inches long was made over the tumor and wide dissection carried out to the fascia of the sacrospinalis muscle. A portion of the fifth lumbar nerve about 2 inches long was dissected and removed. The wound was closed with interrupted silk sutures, and sulfathiazole powder was applied. This patient also experienced complete relief immediately after operation. It has been impossible to follow her progress since.

Case 3.—A woman aged 50 complained of pain in the back and along the back of the left leg, which had been present two months and had become exceedingly severe during the last week. A palpable nodule was found in the left sacroiliac region; this was relieved by metycaine injections. Under 2 per cent procaine infiltration anesthesia an incision was made just lateral to the left sacroiliac joint down through the fatty tissue. With a combination of blunt and sharp dissection a mass of fatty tissue was excised. The specimen consisted of three similar irregular masses of yellow adipose tissue measuring 1, 1.8 and 4 cm. in longest diameter respectively. Cross sections were homogeneous except for foci of hyperemia and hemorrhage. Microscopic sections showed fragments of fat, with edema and focal hemorrhage; there was no inflammation or necrosis. Pain in the back was completely relieved, and there has been no recurrence in the nine months since.

Case 4.—A woman aged 48 had been struck by a 2 by 4 plank in the left buttock eighteen years previously and had had a "weak" back ever since. Two years before, the pain had become appreciably worse. Osteopathic treatments had afforded no relief and she had spent more time in bed than out during this period. The last two weeks the pain had become unbearable. When she was standing or walking the pain seemed to advance from the heels over the calves and thighs into the back. She was carried into the office for examination, which revealed a nodule in the left gluteal region. This was circuminjected with 2 per cent metycaine solution. The pain subsided promptly and the patient was able to get up from the couch and walk out of the office unaided. Injection of the nodule was done again twenty-four and forty-eight hours later, at which time she was hospitalized for operation.

An incision about 4 inches long was made over the fatty tumor in the left sacroiliac region about 2 inches below the iliac crest. On division of the superficial fat and retraction of the edges of the wound a fat tumor about 2 cm. in diameter popped into the wound; this was densely adherent to fascia of the gluteal muscles. It was dissected with sharp dissection and excised. After it was removed, another tumor about the same size appeared in the wound; this was also removed by sharp dissection. Exploration revealed no additional tumors.

The specimen consisted of two similar small roughly round masses of homogeneous lobulated yellow fat measuring 2.5 and 4 cm. in diameter. Both were composed of homogeneous adipose tissue showing focal edema and hemorrhage; there was no inflammation.

The patient had complete relief from pain when she emerged from the anesthetic.

Case 5.—A woman aged 42 was first seen in November 1944 complaining of back pain and pains in the legs of more than two months' duration. She had been under the care of another physician and had been hospitalized for complete examination but had been dismissed without a definite diagnosis and with the pain persisting. My own examination at that time did not reveal a definite mass, and the diagnosis was indefinite. This attack subsided, but the patient consulted me again in March 1945, after having suffered an exacerbation of the pain for five weeks. At this examination a definite tumor was palpated in the left lumbar region, and pain was relieved by injection of metycaine solution.

At operation an incision about 4 inches long was made about 2 inches below the crest of the ilium. A herniation of fascial fat was located and excised, with some surrounding fatty tissue. The pathologic diagnosis was fatty tissue, herniated tumor. Pain was absent when the patient emerged from the anesthetic and she was out of bed, walking, the following day.

Case 6.—A woman aged 51 sought relief from low back pain at a time when she was having an exacerbation of excruciating pain. She had had pain in the lumbosacral region, radiating into the groin and thigh, especially on the left side, with periodic exacerbations of severe agony. Roentgenograms recently made at an osteopathic clinic had shown calcium deposits in several vertebrae but no lesion in the sacroiliac region. Tender masses were found on both sides of the spine in the sacroiliac region; circuminjection of these produced prompt relief of pain.

The diagnosis was bilateral herniations of fascial fat. At operation a 4 inch incision was made over each mass. Hernial openings in the fascial membrane were found and the herniated fat was excised on both sides. Each hernial opening was closed with three interrupted sutures of chromic number 1 catgut. The skin was sutured with number 30 alloy steel wire, and sulfathiazole was applied to the wounds. Immediately after operation the patient experienced complete relief.

The pathologist's report was as follows: The specimen consisted of two similar flat masses of yellow adipose tissue meauring 3 and 3.5 cm. in diameter and a few millimeters in thickness. The outer surfaces were slightly nodular and covered in part by strands of pale gray firm connective tissue. Cross sections showed homogeneous fat. Also present were eleven separate similar small fragments of yellow lobulated fat measuring 1 to 1.5 cm. in diameter. Cross section showed that the strands of connective tissue partly lobulated the adipose material.

Microscopic examination of the specimen removed from the left side showed mature adipose tissue supported by numerous strands of dense collagen. Focal edema and hyperemia were present, but no exudative change. In some places small nerve fibers and nerve trunks were observed in the collagenous stroma. The specimen from the right side consisted of mature fat with only a small amount of fibrous connective tissue. Edema, focal hemorrhage and hyperemia were present, but no inflammation was found. No nerve tissue was identified in the second specimen.

The pathologist's diagnosis was fibroadipose tissue, the seat of edema and hyperemia (region of the left buttocks), and adipose tissue, the seat of edema and hemorrhage (region of the right buttocks).

SUMMARY AND CONCLUSIONS

In 6 cases excruciating pain in the back, sometimes accompanied by leg pain, was relieved by removal of a herniated tumor of fascial fat. In all instances there was a palpable mass which proved to be a trigger point

of pain, and the diagnosis was confirmed by injections of anesthetic solutions around the mass, which produced prompt though temporary relief.

Since pain in the back is such a common cause of disability, any light that can be thrown on any of these cases is valuable from the clinical standpoint. There are many known causes of back pain for which there are standard treatments, but there are also many cases in which the cause is obscure and the patient gets little or no relief from symptomatic treatment. In some cases severe pain in the back is attributed to psychic disturbances. It seems probable that some patients (perhaps a fairly large proportion) in whom the cause of back pain has not been diagnosed previously may have herniations of fascial fat and that surgical removal of these will bring prompt and lasting relief. This operation is not presented as a panacea for all types of low back pain. However, it seems certain that if the possibility of such a lesion is recognized and if careful examination is made for palpable masses which may prove to be trigger points of pain, numerous patients may by this procedure be relieved of a condition that has been incapacitating, sometimes for many years.

1990 Ford Drive, Cleveland 6.

CALLUSES, CICATRICES AND OTHER STIGMAS AS AN AID TO PERSONAL IDENTIFICATION

FRANCESCO RONCHESE, M.D.
PROVIDENCE, R. I.

From Ramazzini to the modern outstanding works of Oppenheim,[1] Natori,[2] Prosser White [3] and Schwartz and Tulipan [4] much has been written on the subject of professional stigmas.

Many investigators have been interested particularly in a rapid detection of a person's occupation or business by a glance at his palms, by his general appearance, by the odor emanating from his body or clothes, and so on. For instance Tardieu,[5] in his lengthy paper published almost a century ago, tells of the pride of Corvisart, Dupuytren and Trousseau in announcing the patient's profession at first sight.

The present study is an attempt to assemble examples of stigmas, some characteristic and common, valuable for identification purposes, some uncommon or rare or obsolete, of much less practical value but interesting.

Most of the observations were made on private or hospital patients seeking various forms of medical care. Inevitable omissions and errors are due to the difficulty of covering all trades or professions, to the ever changing ways of doing the same kind of work, to the machine substituting for man, giving him a handle to grasp or a pedal to press instead of employing his fingers, to the use of gloves or other protecting devices, to the variety of works using the same tools and producing the same calluses, and to the disappearance of some of them soon after the work is discontinued. Hence a characteristic stigma has a positive value when found, but a trade or profession cannot be ruled out when it is not found.

Fig. 1.—Location of the stone cutter's "ring."

A stone cutter can use heavy gloves, and the characteristic callus on his little finger (figs. 1 and 2) may be missing. A tailor may show only needle marks on his left index finger tip, if he is a sewer, or only a heavy callus on his right thumb, if he is a cutter.

There are manual laborers with unmarked hands because of the use of gloves, and intellectuals with laborers' hands because of sporting or laboring hobbies.

Fig. 2.—The stone cutter's "ring," one of the most characteristic examples of a stigma helpful for personal identification because exclusive of the stone cutter or maker of funeral monuments or curb stones, mostly using the mechanical chisel resting on the little finger.

A small number of trades or professions leave characteristic, unique, unchallengeable stigmas.

The skin has been called the monumental façade of the human body telling the age, the peaceful or

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From the Department of Dermatology, Boston University School of Medicine. Drawings by Adrian J. Iorio.

Figure 6, a color plate, omitted from this article as published in THE JOURNAL, will appear in the author's reprints.

Read before the Section on Dermatology and Syphilology at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 16, 1944.

1. Ullmann, K.; Oppenheim, M., and Rille, J. H.: Die Schädigungen der Haut durch Beruf und gewerbliche Arbeit, Leipzig, L. Voss, 1922; Ein noch nicht beschriebenes berufliches Kennzeichen der Lokomotivführer und Heizer, Dermat. Wchnschr. **95**: 1674, 1932.

2. Natori, H.: Ueber Beziehungen zwischen Berufsarten und Handschwielen vom gerichtlich-medizinischen Standpunkte aus: Part II, Acta dermat. **3**:253 (July) 1924.

3. White, R. P.: Occupational Affections of the Skin, New York, Paul B. Hoeber, 1915.

4. Schwartz, L., and Tulipan, L.: A Text-Book of Occupational Diseases of the Skin, Philadelphia, Lea & Febiger, 1939.

5. Tardieu, A.: Mémoire sur les modifications physiques et chimiques que détermine dans certaines parties du corps l'exercice des diverses professions, pour servir á la recherche médicolégale de l'identité, Ann. d'hyg. **42**: 388, 1849; **43**: 131, 1850.

calamitous past, the effeminate or virile character, the constitution of its bearer.[6] The hands are an important part of the revealing monumental façade. They may record what the face may conceal. The warm and dry handshake, the cold and clammy handshake, the clasping and twisting and biting of one's hands in an effort to control one's emotions, the opening of the same hands in a state of peace and relaxation, the gesture in conversation or public speaking are revealing psychologic characteristics. Material past and present are revealed by the professional marks (calluses, scars, pigmentations, tattoos and the like). Illnesses (such as cachexia, hemiplegia, arthritis, parkinsonism, pellagra and thyrotoxicosis) leave distinctive signs. Besides the dead, identification may be useful in the living, in cases for instance of amnesia or of unsatisfactory fingerprints.

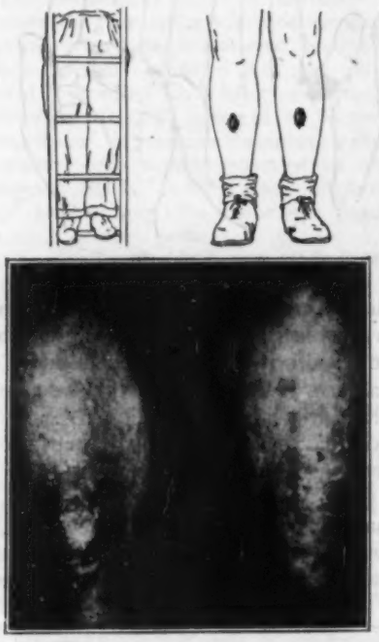


Fig. 3.—The painter's calluses, an elongated yellowish swelling about the middle of both shins from pressure on one rung of the ladder on an area practically without subcutaneous fat: a good professional stigma. However, it can be found in carpenters doing some painting, in maintenance workers in any factory, in electricians and, in general, in a worker standing for a certain length of time on a ladder.

Fingerprinting is considered the infallible method of personal identification. However, besides the cases in in which no fingerprints had been previously recorded, or the case of the criminal having a plastic operation done, there are cases in which fingerprints are unsuccessful, temporarily or permanently. For instance, in diseases of the skin, such as acute or chronic eczema involving the fingertips, there is peeling or cracking or smoothing out of the fingertips sometimes so severe that the remnants of papillary lines may be useless for fingerprinting purposes. This is, or may be, only a temporary occurrence, but it is a frequent one. Just consider how common is eczema of the fingers and one can figure out how often fingerprinting may fail. In chronic diseases of the skin, as in scleroderma, Raynaud's disease and Darier's disease, the absence of fingerprinting possibilities is permanent.

Fig. 4.—Most common calluses of the jeweler-engraver's profession.

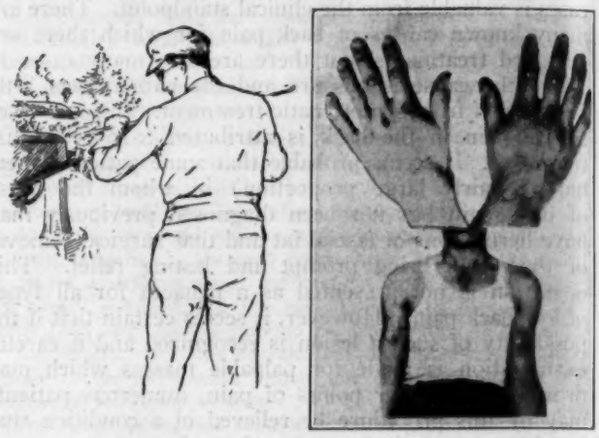


Fig. 5.—Quite characteristic stigmas of the optical glass molder. In spite of gloves or clothes, knuckles and arms receive repeated burns while standing in front of small ovens heated to 2300 F. Scars may also be found on dorsa of feet from dropping molten material.

Transitory absence of papillary lines is found in workers handling heavy and rough metal parts (steel, file, bricks), in pottery workers and in marble polishers. Some of the workers remark that they are free to commit a crime because their fingerprints will not identify them. This absence may, of course, be for short duration. In fact, papillary lines are promptly reformed as soon as work is discontinued. But if a worker is killed at work and his body lies unidentified and no help is to be obtained from his fingertips, other means of identification may become useful. This is the case in which professional calluses, worn out fingertips or scars may supply the identifying clue.

Fig. 7.—The junk worker or dealer shins. A good professional stigma, found in a lesser degree in railroad conductors or engineers, garbage collectors, firemen, truck drivers, foundry workers and others.

Ribeiro,[7] a pioneer in the study and demonstration of the shortcomings of fingerprinting, has demonstrated in several publications the cases of Brazilian convicts fingerprinted successfully in their youth; but fifteen to twenty years later this was useless

6. Comel, M.: Fisiologia normale e patologica della cute umana, Milan, Fratelli Treves, 1933.

7. Ribeiro, Leonidio: Dáctilo-diagnose (contribuição da medicina legal para a propedêutica médica), Rio de Janeiro, Imprensa Nacional, 1939.

because of the damage done to the papillary lines by leprosy. He even published the report of a case in which the altered papillary lines led to the diagnosis of leprosy.

Textbooks of dermatology and forensic medicine, very meager in text and illustrations on stigmas from trade or profession, do not even mention diseases or conditions making fingerprinting useless.

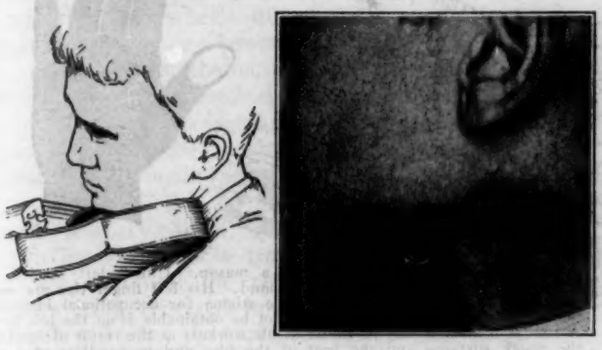


Fig. 8.—The acneform dermatergosis of the violin or viola player, an exclusive stigma of the profession. A rather small percentage of violinists show a stigma as conspicuous as the one in the illustration. Generally it is found in players of the thin, pale, feminine type.

The odor emanating from clothes or the body may help considerably in determining the social status, the profession and the ancestry. Characteristic odors can be detected in bartenders permeated with the peculiar smell of the bar room, in incinerator workers and ash collectors from ashes, in doughnut dough mixers from vanilla, in tanyard workers, butchers, sauerkraut packers, fertilizer manufacturers, fish dealers or fishermen, stable hands, sewage farm attendants or dish washers,

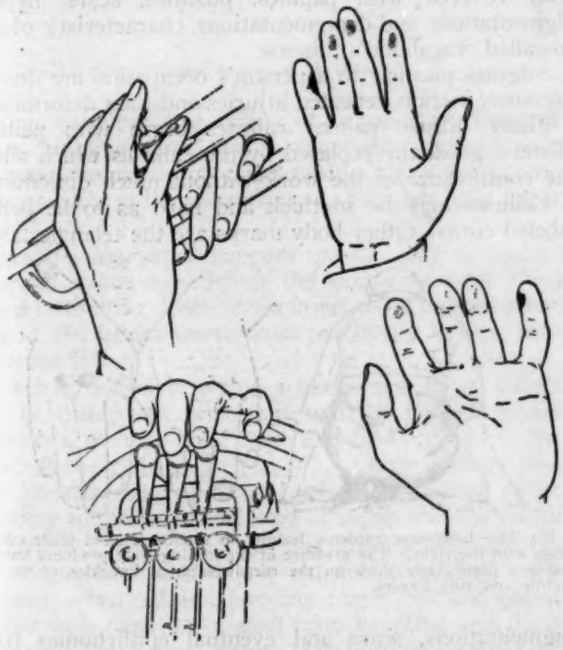


Fig. 9.—Above, callus on right little finger of the trumpet or tuba player. Below, callus on left little finger of the French horn player.

from the material contacted, from perspiration and from general habits of uncleanliness.

A characteristic odor emanates from grocers handling special types of food. For instance, persons working in Italian grocery stores where strong cheeses and peculiar smelling seasoning spices are handled all day emanate a distinctive odor from their clothes.

The odor of tobacco from cigarets, cigars or a pipe has little importance for personal identification, because

Fig. 10.—Characteristic and peculiar callus of the jazz band drum player.

Fig. 11.—Cauliflower ear of the boxer-wrestler. With it goes a cracked nose, dislocated thumbs, a blind eye, eyebrow scars and the body build of a male fighter (female boxers are still rare). (Courtesy of Alfred A. Monner, Portland, Oregon.)

practically everybody indulges in one or all of them. However, when certain types of cigars are used by a relatively small percentage of the population, of one ancestry, the finding of those cigars and the odor emanating from the clothes or impregnating the room may be of diagnostic importance in the determination of the same ancestry. While others than Italians may occa-

sionally smoke a stogie, it can be safely stated that, when one sees one of those hard, thin, black, smoking sticks in a man's mouth, or if it is found in a man's pocket, the man is not only of Italian ancestry but almost certainly a native of Italy.

The color, besides the race, may give a hint of the occupation. Workers in contact with coal tar and petroleum derivatives show melanosis of the exposed

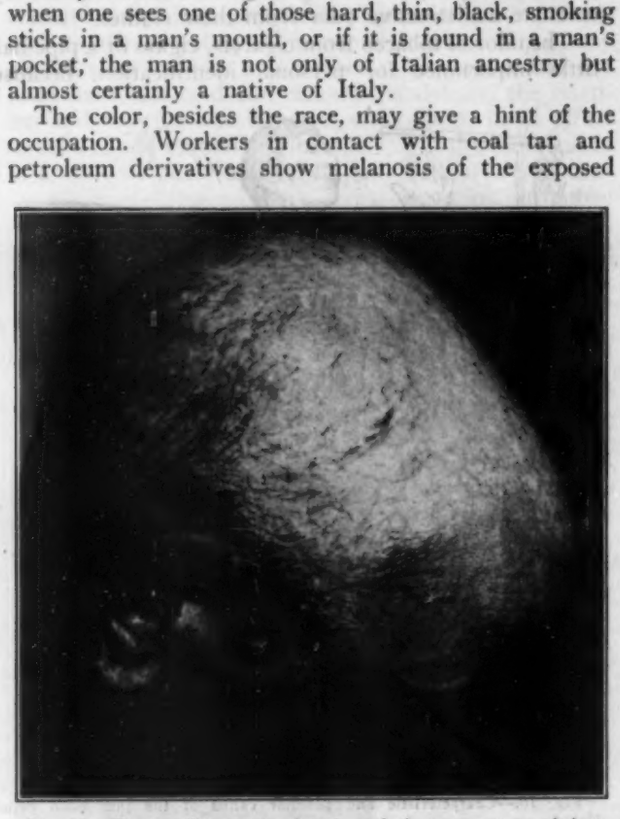


Fig. 12.—The peculiar scarry alopecia and the sparse coarse hair on the sides of the head of a commonly bald man, remnants of tinea favosa suffered during youth. This is common in Europe and rare in this country. Consequently its bearer is most likely of European birth.

parts and eventually cancer from photosensitization. Silversmiths may absorb so much silver as to become slate gray. Explosive powder workers, called "canaries," can be recognized in the street because of a

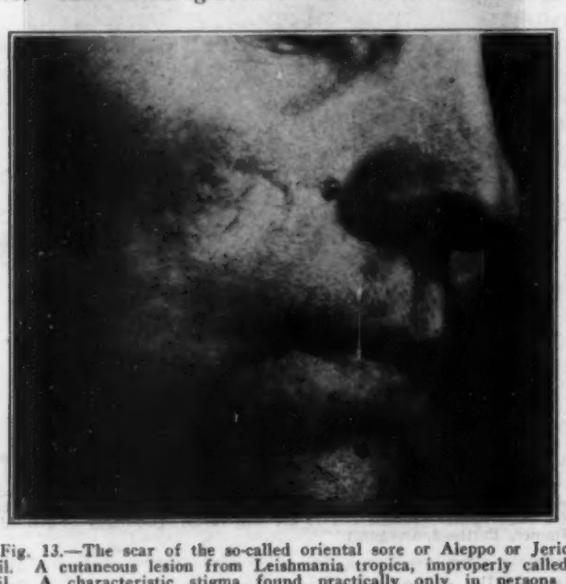


Fig. 13.—The scar of the so-called oriental sore or Aleppo or Jericho boil. A cutaneous lesion from Leishmania tropica, improperly called a boil. A characteristic stigma found practically only in persons of Armenian birth, in lesser number in Syrians and in general in natives of Asia Minor.

peculiar red-yellowish stain of hair and skin from tetryl. Workers with explosives may show deep yellow stains and exude the odor of picric acid. Yellow stains on the fingers can be found in laboratory workers from the xanthoprotein reaction of nitric acid, in jewelers from cyanides, in canners of pickles, in inveterate cigaret smokers. Photographers, shoemakers and shoeshiners show black stained nails. Electric bulb cleaners show a black discoloration of the nails from hydrochloric acid.[8]

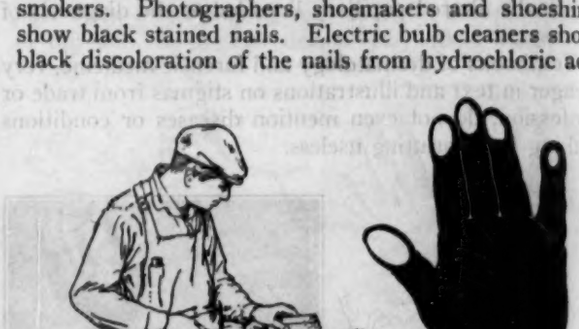


Fig. 14.—The left finger tips of a mason. Unless left handed, he grabs the rough brick with his left hand. His left finger tips are worn out, shiny, often bleeding, a valuable stigma for occupational identification. Satisfactory fingerprints may not be obtainable from the left hand. A similar condition may be found in file workers as the result of handling the rough surfaces and the heat of the files and in handlers of heavy metal parts

A peculiar depigmentation of the forearms in Negro tannery workers has been reported by Oliver and Schwartz[9] from an antioxidant added to the rubber of the gloves. Cleaners using oxalic acid show blue discolored fingers. Furniture polishers show reddish discoloration of the nails and shiny, worn out nails.

Age can be fairly well estimated from the color as well as texture in the so-called farmer or sailor or fisherman skin and from the middle age and old age spots popularly associated with the liver.

The hobo's "profession" can be recognized in a body covered with papules, pustules, scars, hyperpigmentations and depigmentations, characteristic of the so-called vagabond's disease.

Stigmas peculiar to a person's occupation are due to pressure, friction, repeated injuries and joint deformities.

Many diffuse palmar calluses begin with painful blisters, gradually replaced by the calluses which allow the continuance of the work without much discomfort.

Calluses may be so thick and hard as to be better labeled corns. Other body marks are the telangiectases,

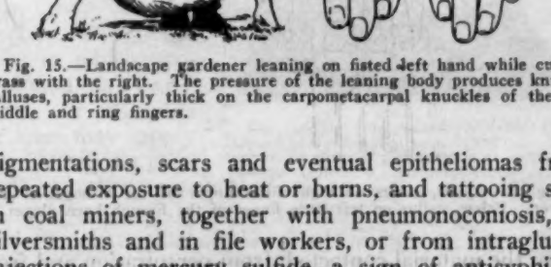


Fig. 15.—Landscape gardener leaning on fisted left hand while cutting grass with the right. The pressure of the leaning body produces knuckle calluses, particularly thick on the carpometacarpal knuckles of the left middle and ring fingers.

pigmentations, scars and eventual epitheliomas from repeated exposure to heat or burns, and tattooing seen in coal miners, together with pneumonoconiosis, in silversmiths and in file workers, or from intragluteal injections of mercury sulfide, a sign of antisyphilitic treatment. Scars are often characteristic of the man's

8. Downing, J. G.: Personal communication to the author.
9. Oliver, E. A.; Schwartz, L., and Warren, L. H.: Occupational Leukoderma, Arch. Dermat. & Syph. 42:993 (Dec.) 1940.

occupation, the classic ones of the shoemaker's knife on the right thigh, for example.

The importance of tattoo marks for identification purposes is well known. In fact, the tattooed often give identification as a reason for doing it.

Besides the actual name or initials of the owner, battleships, flags, knots and naked or seminaked women point toward the sailor's profession. Occupational signs, as a hammer or a razor, indicate the profession of carpenter or barber. Obscene figures and mottoes suggest a criminal or a prostitute. Tiny flowers, butterflies, united hearts, chains, artificial beauty spots, ruby tattooed lips suggest the body of a female.

Specialists in tattooing can recognize from the technic employed where the work was done and eventually identify the nationality of the tattooed.

The hand of the laborer shows characteristically rugged, leathery, thick, yellowish palms and rough, reddish brownish dorsa from the sun, the wind, the heat, the cold and the repeated injuries, and thick knuckles from repeated knocks. If past middle age, his dorsa will show the keratoses of the so-called farmer or sailor or fisherman skin, the forerunners of cancer.

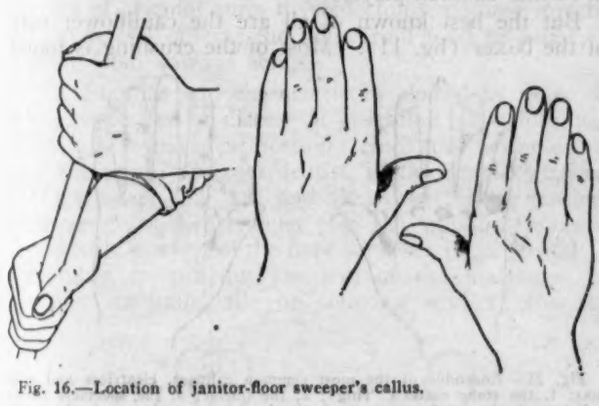


Fig. 16.—Location of janitor-floor sweeper's callus.

Stone chiselers (the maker of monuments, sidewalk stones, building bases, marble ornaments) have a most characteristic mark of their profession, a large, soft rubbery callus at the proximal end of the left little finger (figs. 1 and 2).

Painters and paper hangers have a very distinctive elongated callus exactly on the center of both shins (fig. 3) resulting from the continuous pressure of one rung of the ladder on an area practically lacking subcutaneous fat.

Jewelers, engravers, ring makers and stone setters have as their most important tool the "plier," which produces a characteristic large and heavy callus in the center of the right palm (fig. 4). Other calluses also quite characteristic of the jeweler's profession differ according to the particular kind of object manufactured.

Machinists, mechanics and tool makers have in general rough hands and deeply cut and scratched, worn out nails, worn out and bleeding finger tips and palms studded with particles of steel from handling and filing rough and heavy steel parts. Machine oil, cutting oil and soda water do their part in roughening the hands of mechanics.

The handling of materials coming from highly heated ovens as in foundries and by optical (fig. 5), knife, file and incinerator workers produces heavy, painful calluses and deep fissures often necessitating discontinuance of work until the tissues are returned to a fair condition.

An interesting stigma can be observed in most foundry workers, feeders of large boilers and melters of metals. A forearm may be exposed continuously to such an intense dry heat in the procedure of pulling hot materials from the ovens that a red streak remains to tell the tale. Only a few spots show scar tissue.

Fig. 17.—Janitor-floor sweeper's callus. Illustration at right shows an epidermoid carcinoma of grade 2 in a 50 year old woman, very likely an occupational carcinoma.

Except for the color, the skin and hair appear normal. The vivid red discoloration fades on vitropressure and could be taken for a common port wine birth mark. It is made up of telangiectases, as in radium or x-ray

Fig. 18.—The milker's nodules, a rather rare stigma of farming: warty, umbilicated nodules, somewhat similar to molluscum contagiosum but of a peculiar deep red, as if painted with mercurochrome. They are supposedly due to the entrance of a cow's hair into the skin. Essentially a foreign body reaction.

dermatitis the result of the repeated vasodilating stimulation of the heat. It is a perfect example of erythema ab igne (fig. 6).

Suppose a body is burned beyond recognition or a living but speechless or amnesic person is unidentified.

A streak of a vivid birth mark-like red on a forearm will tell that the person's occupation was in a foundry or, in general, in a factory where he had to stand in front of a highly heated oven or boiler.

The junk collector shin is represented by abrasions, cuts, scars and pigmentation (fig. 7). In a minor degree

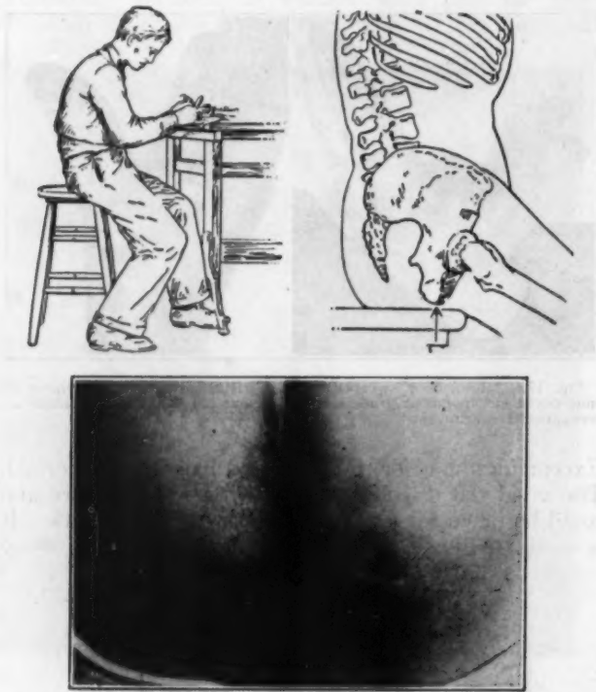


Fig. 19.—The marks of a sedentary occupation and their mechanism. Such an occupation is revealed by two areas of redness, scales, scars and atrophy due to the pressure on the skin between the seat and the ischium. Acne and boils may develop in this area from friction. An acneform dermatergosis like the one of the violin player. Two areas of hyperpigmentation may be found even if sedentary work has been discontinued for years.

the marks are noticeable in garbage collectors, truck drivers and foundry workers for the same reasons as the junk dealer and in railroad conductors, ship pilots,

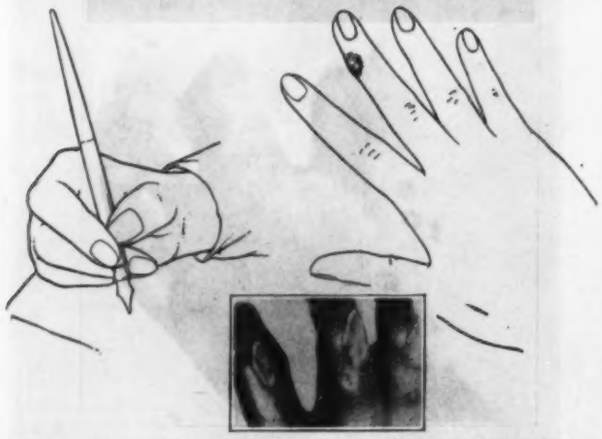


Fig. 20.—The writer's callus (of students, designers, bookkeepers), a stigma shared by dentists (from use of the drill), manipulators of small screw drivers (in work on jewelry, optical goods and precision instruments), painters from the brush and seamstresses from the thimble.

engineers and firemen, from hitting the steps of the railroad car or engine or ladder rungs.

Other interesting calluses are found in textile workers, bakers, shoemakers, tailors and cooks.

In the musical profession the callus on the neck of the violin or viola player is one of the most characteristic trade marks of all professions (fig. 8), a thick, acneform, scarry lump about the angle of the lower jaw, extending downward for a few square centimeters as a swollen area, soft, with hypertrophic hair follicles and sebaceous glands, with secondarily acne-like infected follicles, abscesses and finally acneform scars. Predisposition plays a great part in the development, size and severity of the violinist callus.

Characteristic calluses are found on certain finger tips of musicians, especially in the viola-violin, cello-contrabasso, guitar, saxophone, trombone, French horn (fig. 9) and jazz drum player (fig. 10).

The implements of some sports, such as the bar, the oar, the rope, the golf club, do not leave marks much different from what is produced by common manual labor, except for location; e. g., the golfer usually has calluses only on the left hand. The calluses of the golf player, shared by the baseball player, are also partly found in the carpenter. Characteristic calluses are found in the discus thrower, the bowler and the squash-tennis-badminton player. A characteristic mark is the permanently contracted in flexion tip of both little fingers due to the injury from passed balls in former baseball players.

But the best known of all are the cauliflower ears of the boxer (fig. 11). Most of the crushing is found

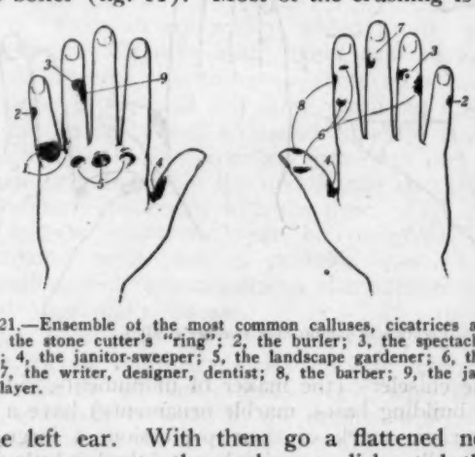


Fig. 21.—Ensemble of the most common calluses, cicatrices and stigmas: 1, the stone cutter's "ring"; 2, the burler; 3, the spectacle frame polisher; 4, the janitor-sweeper; 5, the landscape gardener; 6, the seamstress; 7, the writer, designer, dentist; 8, the barber; 9, the jazz band drum player.

on the left ear. With them go a flattened nose, a blind eye, scars on the eyebrows, dislocated thumbs and the build and sex of the body.

Scars, with few exceptions, are permanent, unremovable signs of something which has happened in the past. They stand as an unquestionable, unchallengeable proof of a past malady or operation or accident. Scars of the so-called Jericho or Aleppo boil or oriental sore (fig. 13), besides being a proof of previous disease, are a very valuable racial sign (Armenians).

Certain scars are positive signs of one disease or one operation, such as the scars of thyroidectomy, appendectomy, thoracoplasty, the square scar left by the radium plaque, the loss of substance of the frenum from a primary chancre, the typical archiform sequelae of late cutaneous syphilids, the radiating lines about the mouth remnants of infantile syphilitic rhagades and the scars of smallpox and of tinea favosa as a possible indication of foreign birth.

Dental lesions have been described in upholsterers, shoemakers and seamstresses from holding tacks or needles between their teeth. They seem to be of but small practical value.

Black-blue lines on the gums, cheeks or palate are valuable in demonstrating that the bearer is under bismuth therapy.

The only valuable professional or diagnostic sign obtained from the nails is left by trauma (saw bites, needle punctures, wheel or gear crushes, knife chopping, wear from handling rough material, chemical burns, infections, felons, x-rays and radium, wear and luster in severe chronic pruritus). However, the tiniest pit or detachment from the nail bed may be most valuable in the diagnosis of psoriasis.

Club nails, Beau's lines and spoon nails, in spite of hundreds of papers written and dozens of diseases or conditions held responsible for them, are interesting observations but of no diagnostic value.

SUMMARY

Stigmas and other body characteristics can be roughly divided in four groups according to their usefulness as an aid to personal identification:

1. Stigmas and characteristics very helpful because peculiar to one profession, one race, one disease or one operation. Such may be the calluses of certain musicians, the stone cutter, the sweeper, the barber, the shoemaker, the tailor, the cook; the telangiectases and burns of the foundry and optical glass molder; the scars of oriental sore, thyroidectomy, cocaine injection, radium and others; the odor from food or ashes; the color from various stains.

2. Stigmas and characteristics shared by more than one profession or disease or operation but helpful as an aid to personal identification. Such may be the calluses of the writer-designer-dentist, of the jeweler-engraver, of the mason (fig. 14) and file worker, of the plasterer-carpenter, of the gardener (fig. 15), plumber, housewife or textile worker, of the floor scrubber (figs. 16 and 17), plumber or praying kneeler; of the machinist, tool maker or knife, file or foundry worker; the scars shared by chickenpox and the remnants of removal of moles.

3. Stigmas and characteristics moderately helpful as an aid to personal identification. Such may be the packer-baker alopecia and acneform dermatergosis of the thighs from friction against the bench; the milker's nodules (fig. 18); the quite common marks on the buttocks in sedentary occupations (fig. 19); the nail mutilations in onychophagia as a sign of latent or well developed neurosis.

4. Stigmas and characteristics uncommon, rare or obsolete or from far away countries are interesting but of little value as an aid to personal identification. Such may be the calluses of stevedores carrying coal baskets on their shoulders; the funnel shaped chest of the cobbler; the warty growths of cement, asbestos, fiberglass workers; the clean calluses of the soles in Turkish bath attendants.

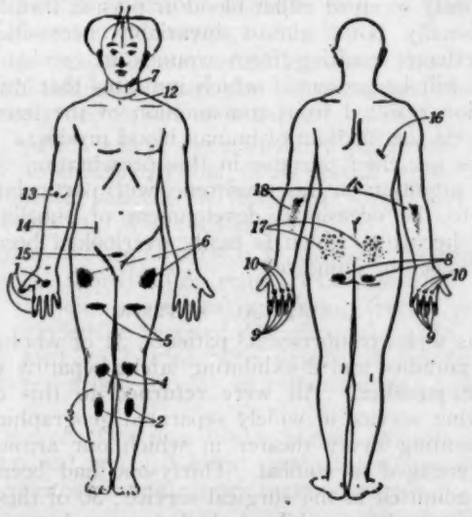


Fig. 22.—Ensemble, continued: 1, jewelers, engravers; 2, painters; 3, junk handlers, railroad workers; 4, floor scrapers, plumbers, those who kneel in prayer; 5, packers, bakers, leaning against table; 6, basket carriers; 7, violin, viola players; 8, marks of a sedentary occupation; 9, scrub women, plumbers, knuckle calluses; 10, landscape gardener (metacarpophalangeal knuckle calluses); 11, boxers', wrestlers', ears, nose, eyebrow scars; 12, thyroidectomy scar; 13, blood transfusion scar; 14, appendectomy scar; 15, steel brace mark; 16, empyema scar; 17, scar from old time antisyphilitic treatment; 18, packers or any workers leaning on the elbow.

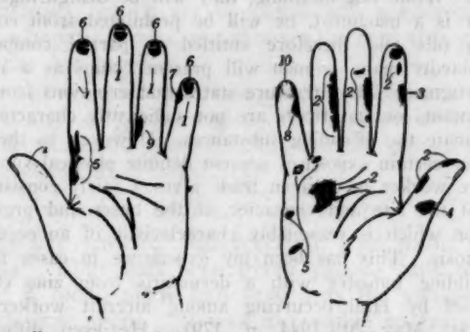


Fig. 23.—Ensemble, concluded: 1, masons' or bricklayers' worn out left finger tips; 2, jewelers, engravers; 3, barbers; 4, cobblers; 5, golf players; 6, stringed instrument players; 7, French horn players; 8, trumpet, tuba players; 9, trombone players.

CONCLUSION

Stigmas of a profession or disease are an interesting subject of study in dermatology and industrial medicine. In event of nonprintable fingerprints, which is not as rare as commonly believed, in amnesia and in other instances they may be a valuable addition to what is known in forensic medicine for personal identification.

170 Waterman Street, Providence 6.

ABSTRACT OF DISCUSSION

DR. LOUIS SCHWARTZ, Bethesda, Md.: The word "stigmas" is an unfortunate one to apply to abnormalities on the body resulting from occupation, because the word as usually used carries with it a connotation of infamy, while in dermatologic language it simply means the "brand of a trade" on the skin, and there is no intended derogation. The chapter "Die beruflichen Stigmata der Haut" by Dr. Moritz Oppenheim in the first volume of "Die Schädigungen der Haut" defines occupational stigmas of the skin as "the similar changes of the skin occurring in all persons engaged for a long time at a particular occupation." Many of the trade stigmas described in the European literature are not seen in the United States because of differences in the method of manufacture. Many of the old trade stigmas in the United States have disappeared because industrial progress has devised mechanical methods to replace manual operations. Trade stigmas may be classified as resulting from (1) physical forces such as heat, cold and radiation, (2) mechanical causes such as pressure and friction and (3) chemical causes. Some of the stigmas, such as callosities, are a result of an inflammatory response of the skin to irritation; however, they do not impair the worker's functional capacity but rather make it possible for him to continue work without inconvenience. This is a protective mechanism. Trade stigmas may also be classified as (1) transitory, such as callosities and nail changes, because they soon disappear after occupation ceases, (2) as long lasting, such as the comedones, acnes and melanoses, and (3) those which are permanent, such as argyria, keratoses and telangiectases.

DR. JOHN G. DOWNING, Boston: Stigmas must be recognized or they may be mistaken for nonoccupational entities;

for example, the tailor who dips his hands in water many times daily and smooths the cloth with his finger develops calluses which may become fissured, leaving a port of entry for secondary infection with a resulting disability. These might be mistaken for psoriasis, which is considered by most boards to be nonindustrial. I believe we shall see many stigmas resulting from oil folliculitis. These will consist of areas of atrophy, pigmentation and loss of hair, especially on the flexor aspect of the arms and the anterior surface of the thighs. While not disabling, they will be disfiguring. If the worker is a machinist, he will be prohibited from contacting cutting oils and therefore entitled to partial compensation. Undoubtedly many women will present claims as a result of these stigmas. The literature states that eruptions from external irritants or sensitizers are not sufficiently characteristic to incriminate the offending substances. However, to the trained observer certain exposures present definite physical signs. The average worker in a given trade gives a fairly consistent history of the site and character of the onset and presents an eruption which is reasonably characteristic of an occupational dermatosis. This has been my experience in cases from the shipbuilding industry with a dermatitis from zinc chromate, described by Hall occurring among aircraft workers (THE JOURNAL, May 20, 1944, p. 179). He even differentiates between patients suffering from a sensitivity to the zinc chromate alone from that due to the resin ingredient, segregating also those sensitive to both of the constituents in the primer. A tanner presents a hidelike appearance of the forearms. A shoe trimmer's dermatitis appears on the dorsum of the thumb, the radial aspect of the index finger and the dorsum of the hand over the right first and second metacarpals. The dry, fissured appearance of the tips of the right first, second and third fingers, with separation of the free border of the nails, suggests a treer's dermatitis, while the shoedresser discloses a dermatitis on the dorsum of the first, second, third and fourth fingers of the left hand, especially at the tips where he holds the sponge. A soda fountain clerk presents paronychias and vesicles on the lateral aspects of the fingers of both hands, with enlargement of the epitrochlear and axillary glands. A dishwasher's hands are edematous, with maceration of the interdigital spaces; a baker's hand has a similar appearance plus an eruption on the lower half of the ulnar area of the right forearm due to the rotary motion in kneading dough. The eruption of the chocolate dipper generally begins on the right fourth and fifth finger and the outer half of the dorsum of the right hand.

DR. MAURICE OPPENHEIM, Chicago: A few years ago a coal miner was accused of murdering his comrade in a coal mine. The defendant denied ever having worked in a coal mine, but an examination of his skin proved that he was a coal miner. This proof was brought about by the so-called coal line or coal stripe. By hammering the coal in the mines, splinters of coal perforate the skin regularly. These remain permanently. They are mostly in the face; they are on the hands and on other areas of the body too. They are black lines as found in munitions workers, not points as after explosions of gunpowder. These are permanent, because coal in the skin doesn't undergo any change. This coal line or coal stripe was found on the forehead of the accused man. So the conviction was there that he was a coal miner once, what he had denied. He was found guilty of murder. This is my classification of the stigmas of the skin: Transient stigmas: colorings, stratifications, rhagades and excoriations, nail changes, pigmentations and callosities. Permanent stigmas: cicatrices, telangiectasia, hypertrophy of connective tissue, bursa formations, permanent pigmentations, tattooings and impressions. The permanent stigmas are more important than the transient; the latter are limited in their values because during the time of unemployment the laborers are leaving their jobs and taking over other jobs; therefore they are lacking for identification. In the same way as we have experts at police headquarters for fingerprinting, we should have expert dermatologists there who know the stigmas, to help to establish identification of unknown people, and especially of criminals, which asks for a special study and training.

HEPATITIS FOLLOWING BLOOD OR PLASMA TRANSFUSIONS

OBSERVATIONS IN THIRTY-THREE CASES

CAPTAIN EMANUEL M. RAPPAPORT
MEDICAL CORPS, ARMY OF THE UNITED STATES

Hepatitis due to inoculation with homologous serum has received considerable prominence in medical literature during the past few years owing to its widespread incidence following inoculation of troops with normal human serum employed as a vehicle for the yellow fever virus. While the pathogenesis of this disease has not been definitely established, the result of considerable investigation in both this country and England suggests that the icterogenic agent is a virus which retains its virulence after storage for long periods in a dried state. Hepatitis has been produced experimentally in human volunteers by parenteral injection,[1] by feeding [2] and by nasal inoculation [3] of material containing the infective agent.

Similar sequelae following whole blood or plasma transfusions were reported in 9 cases by Morgan and Williamson [4] and in 5 cases by Steiner.[5] Beeson,[6] in describing the occurrence of jaundice in 7 cases following the use of pooled plasma and extracted whole blood, prophetically states that "the present large scale use of blood and plasma transfusions may lead to the occurrence of a considerable number of such cases of hepatitis."

Between May 1 and Dec. 31, 1944, 31 soldiers recently returned from overseas were referred to the gastrointestinal section of the Schick General Hospital because of jaundice which had developed in 9 while en route here and in 22 others while they were being treated in other sections at this hospital. All had previously received either blood or plasma transfusions, occasionally both, almost invariably necessitated by hemorrhage resulting from wounds in combat. Evidence will be presented which indicates that this complication resulted from transmission of the icterogenic agent via the medium of human blood products.

It is my chief purpose in this presentation to focus wider attention on this syndrome, with particular reference to the occasional development of subclinical or latent hepatitis, which is easily overlooked because of the absence of jaundice.

CLINICAL MATERIAL

This series comprises 33 patients, 31 of whom developed jaundice and 2 exhibiting latent hepatitis without visible jaundice. All were returned to this country following service in widely separated geographic areas, representing every theater in which our armies have been engaged in combat. Thirty-one had been originally admitted to the surgical service; 30 of these were battle casualties, while 1 had been subjected to a nephrectomy in Alaska because of carbuncle of the right kidney. Only 2 were referred from other sec-

From the Medical Service, Schick General Hospital, Clinton, Iowa.

1. Oliphant, J. W.: Jaundice Following Administration of Human Serum, Bull. New York Acad. Med. **20**: 429-445 (Aug.) 1944.
2. Experimental Production of Hepatitis, News and Comment, Bull. U. S. Army M. Dept., November 1944, no. 82, pp. 7-8.
3. Findlay, G. M., and Martin, N. H.: Jaundice Following Yellow Fever Immunization, Lancet **1**: 678-680 (May 29) 1943.
4. Morgan, H. V., and Williamson, D. A. J.: Jaundice Following Administration of Human Blood Products, Brit. M. J. **1**: 750-753 (June 19) 1943.
5. Steiner, R. E.: Five Cases of Jaundice Following Transfusion of Whole Blood or Human Plasma, Brit. M. J. **1**: 110-111 (Jan. 22) 1944.
6. Beeson, P. B.: Jaundice Occurring One to Four Months After Transfusion of Blood or Plasma, J. A. M. A. **121**: 1332-1334 (April 24) 1943.

tions of the medical service. Of the latter, 1 had been evacuated from the South Pacific area because of acute infectious eczematoid dermatitis and had received plasma to combat hypoproteinemia which resulted from oozing of serum from the skin lesions. The other was an evacuee from Australia with dementia precox who, while en route to the United States, developed pneumonia, multiple skin abscesses and secondary anemia. He had been given plasma on the hospital ship prior to admission to the West Coast hospital. Following an uneventful recovery he was transferred to the psychiatric section of this hospital, and jaundice developed five weeks after arrival here. In fact, the sudden onset of hepatitis always marred an otherwise satisfactory convalescence from a totally unrelated disease, usually of surgical nature.,

Twenty-two patients developed jaundice one to six weeks following arrival at this hospital. In 9 others icterus had started either while en route to this country or shortly after reaching coastal hospitals. Six had been retained at the latter institutions for observation and transferred here when their condition permitted travel, while 3 were sent on to this hospital without preliminary study. Since the term "jaundice" in this discussion will be used relative to clinical icterus, the 2 cases of latent hepatitis will be accorded consideration apart from the others under the heading "hepatitis without jaundice."

It might be reasonably suggested that jaundice developing in some instances shortly after leaving overseas ports or even after arrival in this country could have been of the epidemic variety, since the disease is ubiquitous. That contact was not a factor in the epidemiology is based on the following considerations:

1. During the period covered by this survey, only those overseas evacuees who had previously received blood or plasma developed jaundice while in this hospital, as shown in the accompanying chart.

2. Battle casualties comprised less than 20 per cent of the total admissions here and yet constitute 93.8 per cent of the group in whom jaundice occurred.

3. If hepatitis was of the epidemic or infectious type, it would be anticipated that chain spread would have involved other patients in the same wards, yet this did not occur in a single instance.

4. During the same period 32 patients observed at this hospital shortly after return from overseas duty acquired jaundice subsequent to leaving foreign ports; 31 had previously received transfusions. The lone exception was an evacuee who developed jaundice of undetermined origin the day he embarked on a hospital ship.

Thus the onset of this disease almost exclusively in those who had received blood products can hardly be considered either fortuitous or due to contagion.

INCIDENCE

It is impossible to determine accurately the frequency of this complication, as no statistics are available recording the number of soldiers who received transfusions prior to admission here. If it should be assumed that every combat casualty received blood or plasma, 2 to 3 per cent would form a conservative estimate of its incidence based solely on observations at this hospital. This estimate is subject to considerable variation and thus cannot be given wide application, since only the more seriously wounded require transfusions. Furthermore, as only the more complicated cases are evacuated and are more likely to have received multiple transfusions, the incidence of jaundice is probably higher among casualties returned to the zone of interior than those remaining overseas.

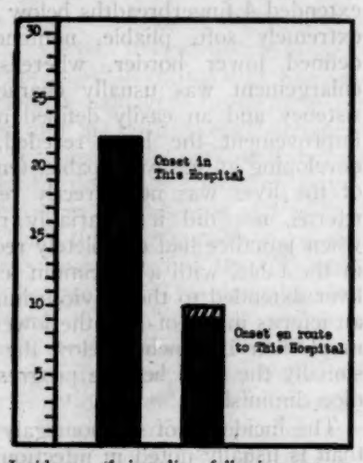
PREDISPOSING FACTORS

No specific factors predisposing to jaundice were noted other than the receipt of blood or plasma. The previous incidence of malaria, dysentery or other debilitating diseases, which are so commonly precursors of infectious hepatitis, was no more frequent in this group than in the nonjaundiced.

There was no antecedent history of alcoholism or liver disease in any of these patients. All had received penicillin and sulfonamide compounds several weeks prior to the onset of this disease.

VEHICLE AND LATENT PERIOD

Twenty-five patients had received 1 or more units of plasma. Four had been given plasma and blood, while, in 2, blood alone had served as the vehicle for the icterogenic agent. It was impossible to trace the original source of the tainted material, as available records merely indicated the amount employed, without denoting lot numbers.



Incidence of jaundice following evacuation from overseas. Solid columns, received blood or plasma; cross hatched, did not receive blood products.

The incubation period varied from nine to eighteen weeks, with an average of 12.6 weeks. Although multiple transfusions were given in 18 cases, the latent period was calculated from the date of the first injection, as no more than four days elapsed between the first and the last transfusion in any case. The long latency of the disease transmitted by inoculation as contrasted with the incubation period in epidemic hepatitis (approximately thirty days) has not as yet been explained. No relationship between the incubation period and the severity of the disease was noted.

SYMPTOMATOLOGY

Preicteric symptoms were frequently more disabling than those which attended the jaundice. Anorexia, malaise, lassitude, headache, chilly sensations, arthralgia, myalgia, epigastric pain and bloating, with nausea and occasional vomiting or diarrhea, were experienced by nearly all. These symptoms were so uniformly present before the onset of jaundice that in 2 cases the prediction that jaundice would follow was correctly made in the absence of positive physical findings. Fever up to 100 F. was present for one to three days in all cases observed in the initial stages. Prodromal symptoms lasted two to four days before jaundice became apparent and continued for three to five days thereafter but usually disappeard rapidly even before icterus began to recede. No correlation between intensity of jaundice and severity of symptoms was noted. Not a single patient in this series mentioned pruritus as a symptom unless specifically asked about itching. All reported

dark urine and pale stools before icterus became apparent. Abdominal pain was usually referred vaguely to the epigastrium or midabdomen, rarely to the right upper quadrant. None of those observed in the preicteric phase presented symptoms suggestive of biliary colic but rather of gastroenteritis or upper respiratory infection. Pain was never an outstanding symptom. Anorexia and lassitude were the complaints of longest duration, but the rapidity with which all symptoms disappeared despite intense icterus and pronounced hepatic dysfunction was remarkable.

CLINICAL FEATURES

This disease is clinically indistinguishable from infectious or catarrhal jaundice spontaneously acquired or from cases of yellow fever inoculation jaundice. The clinical features are so well known that it is unnecessary to dwell on them in detail. The most striking finding apart from the icterus was hepatomegaly without associated tenderness. Although hepatomegaly was noted in all cases, the degree of liver tenderness varied inversely with the extent of enlargement, contrary to expectations. Furthermore, the larger livers which extended 4 fingerbreadths below the costal border were extremely soft, pliable, nontender and with poorly defined lower border, whereas slight or moderate enlargement was usually characterized by firm consistency and an easily defined margin. With clinical improvement the liver receded, becoming firm and developing an easily palpable, tender border. The size of the liver was not directly related to the depth of icterus, nor did it invariably revert to normal size when jaundice had completely receded. Thus in case 5 in the table, with a maximum icterus index of 50, the liver extended to the pelvic brim, while in case 8, with an icterus index of 147, the lower edge never extended more than 1½ inches below the costal border. Occasionally the liver became progressively larger as jaundice diminished.

The incidence of splenomegaly was considerably less than is usually noted in infectious hepatitis. If splenic enlargement occurred it did not reach proportions rendering it palpable except in 1 of the 22 cases that were observed in this hospital from the onset of the disease (case 22). This is hardly a differential point. Abdominal tenderness, when present, was localized to the right of the midline in the midepigastrium, well above the liver edge.

At no time did any of these patients appear seriously ill, nor did their clinical appearance, apart from intense jaundice, reflect the laboratory evidence of severe hepatic involvement. Only 2 (cases 1 and 22) could have been considered moderately cholemic.

Bradycardia was uncommon, while transient urticaria appeared in only 2 cases. Tender axillary nodes developed in 4 cases. There was no correlation noted between age and severity of the disease.

LABORATORY FINDINGS

Blood Count.—Anemia, unless present prior to the onset of this disease, did not occur as a result of it. The white blood cell count, except in 1 case with wound sepsis, ranged between 5,200 and 6,850 with an average of 6,400 during the acute phase; polymorphonuclears varied between 39 and 60, lymphocytes between 36 and 56 per cent, with averages of 51 and 45 per cent respectively. Lymphocytes, particularly when associated with axillary adenopathy, necessitated the consideration of infectious mononucleosis, but serial heterophile antibody tests were uniformly negative. Platelets were normal or slightly diminished; reticulocytes, bleeding and coagulation time were normal.

Icterus.—The icterus index at its peak ranged from 50 to 185; in 10 cases it exceeded 100, while in 5 it never surpassed 75. The quantitative van den Bergh test (Malloy and Evelyn method) was invariably direct positive at the outset but became delayed in 4 during the recovery phase. No special significance is attached to it. The duration of visible jaundice was three and one-half to twelve weeks, with an average of four and one-half, but elevation of serum bilirubin was frequently demonstrated for long periods thereafter. As a rule the duration of hyperbilirubinemia was proportional to the initial intensity of jaundice.

Urine.—Albuminuria and cylindruria were noted in the very early phases in 3 cases. Bile was always demonstrated in the urine in the early stages but during the recovery phase was absent, despite obvious jaundice. Increase of urobilinogenuria as estimated quantitatively could be frequently demonstrated when serum bilirubin was slightly elevated or even normal and when other liver function studies were normal.

Stools.—Pallor of the stools appeared to antedate visible jaundice in most cases. Quantitative stercobilinogen studies were conducted when pale stools suggested acholia, but twenty-four hour specimens always contained more than 30 mg. of stercobilinogen, which is well above the level compatible with complete obstruction. If absolute biliary obstruction ever existed it was probably of short duration.

LIVER FUNCTION TESTS

All methods of evaluating liver function available at this hospital were applied from the earliest stage of observation. Serial studies at regular intervals afforded an effective means of determining the type and degree of hepatic involvement and permitted a reasonable correlation of the respective utility of the individual tests usually employed in assaying both severe and minimal liver damage. Where jaundice had antedated admission here, such complete studies were not initiated at previous installations, but their laboratory findings are incorporated with results obtained at this hospital. These are given in the table, which lists only pertinent data at selected intervals which clearly indicate the course of the disease in the individual case.

(*a*) *Hippuric Acid Excretion.*—The ability of the liver to synthesize hippuric acid was determined by estimating the four hour urinary excretion of hippuric acid after oral administration of 6 Gm. of sodium benzoate. Reduction in this function was evident in the early stages of the disease in all of the 22 cases tested. Rapid reversion to normal occurred in 17 even before jaundice disappeared, while low urinary levels persisted for prolonged periods in 5. In 2 patients without evidence of renal impairment but with severe liver damage, no hippuric acid was elaborated until the recovery phase (cases 16 and 22).

Results with the intravenous test devised by Quick[7] are not included in the table since the material was not available for use until the later phases of this study. Although more sensitive and remaining positive longer than the oral test, in the few cases of this series in

7. Quick, A. J.; Ottenstein, H. N., and Weltchek, H.: Synthesis of Hippuric Acid in Man Following Intravenous Injection of Sodium Benzoate, Proc. Soc. Exper. Biol. & Med. **38**: 77-78 (Feb.) 1938.

which it was employed, normal results were occasionally obtained even in the presence of residual jaundice.

(*b*) *Galactose Tolerance* (40 Gm. oral method).—This test was employed in only 12 cases during the height of jaundice and was normal in 5. It is likely that the intravenous test would have proved more sensitive. Where abnormal results were obtained initially, return to normal occurred earlier than any of the other tests.

(*c*) *Cephalin-Cholesterol Flocculation* (Difco antigen).—The cephalin-cholesterol flocculation test of Hanger [8] was strongly positive at the peak of jaundice in 25 of the 31 cases in this series, dropping rapidly to normal usually within three to four weeks despite persistence of jaundice and other evidences of parenchymatous dysfunction. In 6 cases this test was negative or doubtfully positive throughout the disease despite definite hepatic damage.

(*d*) *Total Cholesterol-Cholesterol Esters.*—Total, free and cholesterol esters were determined by the Schoenheimer and Sperry method.[9] The maximum alteration of the total cholesterol-cholesterol ester ratio was almost invariably due to depression of the ester fraction during the acute stage. This change was noted in 14 of 22 cases, some of which exhibited remarkably low levels. The total cholesterol showed no constant variation. Rise in the ester fraction paralleled clinical improvement but frequently lagged behind the galactose tolerance, cephalin flocculation and hippuric acid excretion tests in reverting to normal. It is to be emphasized that only serial studies are of any value in following the course of jaundice, owing to considerable variation in the total cholesterol and cholesterol ester levels obtained in normals.

(*e*) *Sulfobromophthalein Excretion* (5 mg. per kilogram, thirty minute test).—This test was used when serum bilirubin had returned to normal, as in the presence of an elevation of serum bilirubin above 2 mg. per hundred cubic centimeters retention of dye is inconclusive evidence of impaired function. It could thus be employed in only 18 cases in this series. Retention up to 5 per cent in thirty minutes, which is within normal limits, was present in only 4 patients. Complete clearance of dye was effected by 14 even though clinical evidence of persistent disease remained in some.

(*f*) *Plasma Proteins, Albumin/Globulin Ratio.*—Results of these determinations are not included in the table because plasma protein levels were difficult to evaluate in this series owing to the fact that many of these patients exhibited malnutrition even prior to the onset of jaundice, and their overseas records not infrequently indicated the existence of hypoproteinemia following hemorrhage and wound sepsis. Serial studies revealed no striking changes during the course of this disease, but there was a tendency toward diminution of the A/G ratio chiefly due to a rise in the globulin fraction. Hypoproteinemia, when noted at the onset of jaundice, was actively combated by the use of concentrated serum albumin, so that the albumin fraction occasionally rose despite progression of hepatic damage. Thus, three days after the onset of jaundice in case 22 plasma proteins were 5.7 Gm. per hundred cubic centimeters with A/G ratio of 0.88. Hypoproteinemia at this early stage of hepatitis could not be attributed to the recent liver insult but to previous sepsis which had resulted in considerable malnutrition. Despite evidence of severe disruption of normal hepatic function, plasma proteins rose to 7.0 with A/G ratio of 1.3 following daily parenteral injections of 25 Gm. of concentrated human serum albumin for six days.

(*g*) *Prothrombin Time.*—Significant prolongation of prothrombin time determined by Quick's [10] method was observed in only 1 case (case 22). An initial increase to 105 seconds (normal control 20 seconds) was restored to normal after fourteen days of intensive therapy. Similar changes of a much milder degree were noted in 3, but prothrombin time was normal in all others.

ANALYSIS OF RESULTS OF LIVER FUNCTION TESTS

As would be anticipated, maximum deviations from normal were present during the acute stage. Furthermore, a dissociation of different liver functions and capacities was demonstrated. While individual tests were normal in some cases, analysis of the results of the battery of procedures lends overwhelming support to the belief that disruption of liver function was primarily mediated by cellular damage. Confirming the observations of Turner and his co-workers,[11] impaired excretory function as evidenced by persistent hyperbilirubinemia appeared to dominate the later stages. However, since excretion of bilirubin is the normal function of the liver cell, this dysfunction may well reflect residual cellular damage rather than a faulty extracellular excretory mechanism. This survey further emphasizes the importance of employing a medley of diagnostic methods from the incipience of the disease, and the danger of leaning too heavily on individual or even multiple liver function tests in differentiating obstructive from hepatocellular jaundice. Thus, in cases admitted during the subacute phase, sole reliance on liver function tests would have indicated a subsiding extrahepatic jaundice. Serial studies, however, serve to reflect the remarkably rapid regenerative power of the liver.

MISCELLANEOUS DATA

Duodenal intubation for biliary drainage was instituted in 10 cases to recover bile for microscopic study and not for therapeutic purposes. This procedure was undertaken during the period when jaundice was intense. Bile was obtained in all cases subjected to this procedure and presented a normal macroscopic appearance except that it appeared less concentrated, and B bile could not be identified. Microscopic studies were not remarkable. Occasional pus cells were found in 6 and tyrosine crystals in 1 (case 3). Cholesterol crystals were observed in 4 specimens, probably resulting from diminished bile salts causing precipitation of crystals. Cholecystograms with a double dose of oral dye were taken in 10 cases following subsidence of visible jaundice, because of persistent fat intolerance, of tenderness in the right upper quadrant or of the previous demonstration of cholesterol crystals in the bile. The gallbladder was visualized in all cases and

8. Hanger, F. M.: Serological Differentiation of Obstructive from Hematogenous Jaundice by Flocculation of Cephalin-Cholesterol Emulsions, J. Clin. Investigation **18**: 261-269 (May) 1939.

9. Simmons, J. S., and Gentzkow, C. J.: Determination of Cholesterol: Free, Esters and Total by Schoenheimer and Sperry Method, in Laboratory Methods of the United States Army, ed. 5, Philadelphia, Lea & Febiger, 1944, pp. 211-213.

10. Quick, A. J.: Thromboplastin Reagent for Determination of Prothrombin, Science **92**: 113-114 (Aug. 2) 1940.

11. Turner, R. H.; Snavely, J. R.; Grossman, E. B.; Buchanan, R. N., and Foster, S. O.: Some Clinical Studies in Soldiers After Inoculation with Yellow Fever Vaccine, Ann. Int. Med. **20**: 193-218 (Feb.) 1944,

displayed adequate contraction with fatty stimulation and contained no calculi. Gastric analysis and gastroscopy in cases with persistent dyspepsia were normal.

COURSE

As a rule, jaundice reached its peak of intensity in seven to twelve days after onset of symptoms and then subsided gradually. Sixteen patients were still under observation three to five months after the onset of the disease and some showed symptomatic clinical or laboratory evidence or combinations of these criteria, which, if not conclusively indicative of residual hepatitis, suggested functional or morphologic alterations in the liver.

Abnormal clinical findings alone were unquestionably the most frequent residuums. Tenderness along the right costal border, with or without a palpable liver, was almost invariably found long after complete subsidence of jaundice. When palpable, the liver was firm and tender even when, with considerable enlargement in the early stage, tenderness to pressure had not been noted. Intolerance of fatty foods and pain in the right upper quadrant on bending were the commonest residual symptoms. Slight hyperbilirubinemia or increase in urinary urobilinogen with otherwise normal liver function tests were occasionally the only laboratory findings indicating persistent hepatitis.

HEPATITIS WITHOUT JAUNDICE

The possibility that subclinical forms of hepatitis may result from causes similar to those evoking frank jaundice is well known. Such cases are easily overlooked in soldiers who have sustained multiple wounds, particularly abdominal, because mild, transient symptoms such as anorexia, nausea and lassitude in the absence of visible jaundice may be considered secondary to their primary disease.

This syndrome is illustrated by the following cases:

A.—A private aged 20 sustained shell fragment wounds of his left ankle Sept. 15, 1944. He was given a 250 cc. plasma transfusion the same day, fragments were removed and a cast was applied. Recovery was uneventful and he was evacuated to the United States, arriving at this hospital November 14. He

Summary of Cases

Case No.*	Primary Diagnosis	Latent Period (Weeks)	Maximum Hepatomegaly (Fingers)	Week After Onset of Jaundice	Icterus Index	Serum Bilirubin, Mg. per 100 Cc.	Total Cholesterol-Cholesterol Ester, Mg. per 100 Cc.	Hippuric† Acid Excretion, Gm. per 4 Hr.	Cephalin-Cholesterol Flocculation (48 Hr.)	Galactose‡ Tolerance, Gm. per 5 Hr.	Sulfobromophthalein§ Retention in 30 Min., 5 Mg. Dose	Additional Data and Status on Discharge
1	Multiple head wounds; hemianopsia	18	2	1	110	12.2	156/ 75	2.42	+	4.4	.	Transferred to neurosurgical center; persistent tenderness and slight enlargement of liver
				4	16	2.8	155/ 44	1.6	0	2.0		
				8	7	1.1	166/ 23	1.8	0	—		
2	Compound fracture of femur	18	4+	1	119	15.5	168/100	2.1	++++	1.57	.	Large soft liver at onset, later becoming firm and tender, 1 fingerbreadth enlarged after 3 months
				¾	21	3.1	168/ 98	2.0	0	1.7		
				8	9	1.1	183/116	3.1	0			
				12	7	0.6	.....	...	....	...	0	
3	Acute infectious eczematoid dermatitis	11	2	1	86	9.2	221/ 75	1.9	++++	...	.	Bile contained cholesterol and tyrosine crystals; cholecystogram normal except for diminished dye concentration; no residual symptoms, but liver 1 fingerbreadth enlarged and tender
				2½	49	6.1	190/ 80	2.1	±			
				4	25	3.1	200/100	4.3	0			
				8	15.6	1.9	.....	3.8	0			
				12	8	0.75	198/137	...	....	...	0	
4	Compound fracture of tibia	10	4	1	101	15.1	186/ 52	1.6	++++	4.5	.	Persistent fat intolerance; liver still palpable, firm and tender; bile contained cholesterol crystals; cholecystogram normal, faint gallbladder filling
				3	61	8.4	175/ 60	2.2	+	2.1		
				6	41	4.5	147/ 80	4.24	0			
				10	15	2.1	160/110					
5	Carbuncle of kidney, nephrectomy	10	5	1	50	6.1	114/ 14	1.1	+	1.9	.	Extremely large, soft liver, never tender; transferred to hospital nearer home
				3	23	3.0	152/ 40	2.3	0			
6	Multiple fractures of both legs	18	2+	1	75	8.4	238/ 37	1.1	++++	6.03	.	Received multiple injections of concentrated serum albumin because of hypoproteinemia; persistent fat intolerance; liver palpable
				3	21	3.1	210/ 80	2.5	++	2.7		
				6	14	1.4	.....	2.8	.0			
				12	8	0.9	189/110	3.4	....	...	0	
7	Head wounds; loss of eye	11	3	1	58	7.3	175/ 60	1.3	+++	2.4	.	Asymptomatic on transfer to another hospital; liver still large and tender
				3	21	2.5	178/100	3.9	0	1.7		
				8	9	1.1	163/110					
8	Multiple wounds and fractures	11.5	2+	1	147	18.2	210/ 42	1.2	++++	3.4	.	Asymptomatic; liver enlarged and tender on transfer to another hospital
				3	82	11.3	180/ 51	2.4	+	1.8		
				5	30	5.1	176/ 80	3.4				
				8	12	2.1	168/ 96					
9	Multiple fractures; ulnar paralysis	12	3	1	116	17.1	184/ 45	2.1	++++	...	.	Pus cells and cholesterol crystals in bile; cholecystogram normal; liver edge palpable and tender after 10 weeks
				3	52	8.2	161/ 52	2.6	++			
				6	26	2.8	.....	3.3	0			
				9	8	0.9	166/105	...	....	...	0	
10	Compound fracture of humerus	9	2	1	58	5.8	154/ 70	2.1	+++	...	.	Still under observation
				3	24	3.1	.....	2.2	0			
				5	11	1.4	159/ 98	3.5				
11	Wounds of perineum	12	3	1	94	10.1	240/ 89	2.1	++++	1.9	.	Cholesterol crystals in bile; after 3½ months liver edge palpable and tender; pain in right upper quadrant on bending
				4	33	4.2	224/ 62	2.0	+			
				8	20	3.2						
				12	14	1.9	199/ 80	1.9	0			
12	Multiple intestinal wounds	15	4	1	184	22.1	195/ 40	1.2	++++	4.8	.	At onset plasma protein 6.2; A/G ratio 0.8; received concentrated serum albumin; tender palpable liver on transfer from hospital
				4	79	8.9	174/ 70	2.0	+	2.4		
				8	25	3.4	.....	3.6	0			
				16	8	1.1	170/110	...	0			
13	Multiple wounds; laceration of sciatic nerve	12	1	1	88	9.8	144/ 60	2.1	+	...	.	Asymptomatic; liver still palpable and tender
				3	30	4.2	152/ 89	3.5	0			
				6	9	0.9	151/100	...	....	...	5%	
14	Multiple fractures	14	3	1	120	16.5	228/ 65	1.5	+++	...	.	Persistent fat intolerance after 4 months; liver edge palpable and tender
				3	45	6.1	200/ 80	2.0	+			
				5	14	1.3	182/ 80	3.5	0			
				16	7	0.5	160/ 98	...	....	...	0	

Summary of Cases—Continued

Case No.*	Primary Diagnosis	Latent Period (Weeks)	Maximum Hepatomegaly (Fingers)	Week After Onset of Jaundice	Icterus Index	Serum Bilirubin, Mg. per 100 Cc.	Total Cholesterol-Cholesterol Ester, Mg. per 100 Cc.	Hippuric † Acid Excretion, Gm. per 4 Hr.	Cephalin-Cholesterol Flocculation (48 Hr.)	Galactose ‡ Tolerance, Gm. per 5 Hr.	Sulfobromophthalein § Retention in 30 Min., 5 Mg. Dose	Additional Data and Status on Discharge
15	Multiple leg wounds	9½	2	1	50	5.5	135/ 54	2.2	+++	...	.	Persistent fat intolerance; liver enlarged 2 fingerbreadths and tender
				4	11	1.0	158/ 80	3.7	0			
				12	7	0.4	.....	...	....	...	4%	
16	Chest wound; compound fracture of ulna	14	4+	1	71	9.4	207/ 53	0	0	6.4	.	Asymptomatic; liver 2 fingerbreadths enlarged and tender after 5 months
				2	67	5.9	.....	0	0	3.1		
				4	21	2.3	207/130	3.4	0			
				20	5	0.4	186/119	...	....	...	0	
17	Fracture of leg; bladder wound	16	2	1	84	9.5	118/ 40	1.8	0	...	.	Cholesterol crystals in bile; liver not palpable but right upper quadrant tenderness persists
				4	21	3.2	149/ 50	2.6	0			
				8	9.5	0.8	152/ 98	3.3	....	...	4%	
18	Compound fracture of tibia	10	4	1	73	7.1	208/ 84	1.8	+++	1.35	.	Liver 2 fingerbreadths enlarged on transfer to another hospital
				2	40	5.3	183/101	2.2	+	1.5		
				4	20	1.7	210/154	3.6	0			
19	Multiple wounds	10	2	1	140	23.0	140/ 30	1.6	++	...	.	Still under observation
				3	29	3.4	120/ 50	2.2	0			
				6	10	1.7	117/ 60	3.0				
20	Multiple fractures	12	2	1	105	11.9	168/ 40	1.2	++++	2.4	.	Still under observation
				3	62	5.4	165/ 50	2.3	+	1.8		
				6	24	3.2	158/ 52	3.4	0			
21	Compound fracture of ankle	14	4	1	98	11.8	117/ 38	2.02	+++	...	.	Asymptomatic; physical findings normal; still under observation
				4	32	4.5	128/ 30	2.2	0			
				8	10	1.1	152/118	3.2				
				18	6	0.4	.....	...	....	...	0	
22	Psychosis, pneumonia and skin abscesses	12	3	1	119	19.7	.....	0	++++	...	.	Total protein 5.75; A/G ratio 0.88; prothrombin time 105 sec.; still under observation
				2	75	15.7	.....	0				
				4	68	9.0	.....	1.6	+++			
23	Compound fracture of humerus	10	3	2	97	...	.....	...	++	...	.	Asymptomatic on admission; no abnormal physical findings
				10	6	0.5	.....	...	0	...	0	
24	Compound fracture of ankle	12	?	1	84	...	.....	...	++++	...	.	Liver 2 fingerbreadths enlarged and tender on admission; still under observation
				6	22	2.4	184/ 60	3.1	0			
				10	7	0.7	190/115	...	....	...	0	
25	Multiple abdominal wounds	14	3	1	110	14.1	.....	...	++++	...	.	Liver not palpable but tenderness in right upper quadrant after 4 mos.; fat intolerance
				5	30	3.4	141/ 72	2.9	++			
				16	9	1.1	172/110	...	0			
26	Compound fracture of femur	13	2	2	85	...	.....	...	+++	...	.	Liver edge palpable and tender after 5 mos.; pain in right upper quadrant on motion
				6	8	1.2	176/107	3.4	0			
				20	6	0.5	.....	...	....	...	0	
27	Multiple wounds	16	4	1	93	11.5	.....	...	++++	...	.	Liver barely palpable and tender; persistent fat intolerance; cholecystogram normal
				6	11	1.5	152/ 90	3.8	0	...		
				22	9	0.9	.....	3.4	0	...	3%	
28	Compound fracture of humerus	10	1	1	68	9.4	.....	...	....	...	.	Asymptomatic on admission; physical findings normal
				6	9	1.1	.....	3.1	0			
				12	7	0.6	.....	...	....	...	0	
29	Penetrating abdominal wound	13	?	1	94	...	.....	...	++++	...	.	Liver slightly enlarged on admission; enlarged and tender after 4 months; cholecystogram normal
				4	22	3.1	149/ 70	2.3	0			
				8	9	1.4	176/100	3.5	0			
				15	8	1.0	.....	...	....	...	0	
30	Compound fracture of tibia	10	1	1	81	9.7	.....	...	++	...	.	Liver edge palpable and tender after 4 months; fat intolerance; pain in right upper quadrant
				5	33	4.4	178/ 95	2.3	0			
				9	15	3.2	185/110	3.2	0			
				14	7	0.6	3.3	3.3	....	...	0	
31	Bullet wound of 5th dorsal vertebra	14	3	1	119	12.9	.....	...	++++	...	.	Asymptomatic after 3 months; physical findings normal
				4	25	4.1	118/ 40	2.4	+			
				8	11	1.1	158/ 80	2.9	0			
				12	7	0.6						

* Cases 1 to 22 observed from onset of disease; cases 23 to 31 transferred from other hospitals.
† Normal, 2.5-3.3 Gm. in 4 hours.
‡ Normal, 3.0 Gm. or less in 5 hours.
§ Normal, up to 5% in 30 minutes.

was 1 of 20 patients who, having received plasma three to five months previously, were selected at random in an orthopedic ward for determination of the icterus index and quantitative van den Bergh on December 29 with a view to uncovering cases of latent jaundice. His icterus index was 9.1 and van den Bergh 1.3 mg. per hundred cubic centimeters delayed. Results in all the others of the group were normal. Questioning revealed that for the past two weeks he had noted lassitude, anorexia, nausea and epigastric bloating, although he had not reported his symptoms to the ward officer. Examination revealed no visible icterus. The only significant finding was a firm, tender liver palpable 2 fingerbreadths below the costal border. The spleen was not enlarged. Hemoglobin was 13.5 Gm., the red blood cell count 4,750,000 and the white blood cell count 5,300, with 49 per cent polymorphonuclears and 51 per cent lymphocytes. A comprehensive laboratory survey was instituted, including cholecystogram, x-ray examination of the upper gastrointestinal tract, gastric analysis and gastroscopy, all of which were normal. Cephalin flocculation, hippuric acid excretion (oral and intravenous), urinalysis, heterophile and sedimentation index were normal. Sulfobromophthalein retention in forty-five minutes (5 mg. per kilogram) was 36 per cent.

On Jan. 10, 1945 the icterus index was 9.5 and serum bilirubin 1.5 mg. per hundred cubic centimeters. Because of continuation of his symptoms, he was placed on a low fat, high carbohydrate and protein diet. Symptomatic response was almost immediate.

On January 23 he was relatively asymptomatic on the foregoing regimen and the liver was barely palpable but still tender. The icterus index was 9.0 and serum bilirubin 1.1 mg. per hundred cubic centimeters. Sulfobromophthalein retention in forty-five minutes was 32 per cent. On February 26 the following results were obtained: serum bilirubin direct, 0.35 mg. per hundred cubic centimeters, indirect 0.30 mg. per hundred cubic centimeters (normal); total cholesterol 148 and cholesterol esters 59 mg. per hundred cubic centimeters; cephalin flocculation +; sulfobromophthalein retention 22 per cent in forty-five minutes; hippuric acid excretion after intravenous injection

of 1.77 Gm. of sodium benzoate 0.4 Gm. (normal 0.7-0.9 Gm.); 2 to 4 p. m. urine urobilinogen 1.05 mg. (normal). Although he felt well, the liver was still palpable and slightly tender. This patient is still under observation.

B.—A sergeant aged 25, with three years of military service during which time he had never noted dyspepsia, on Sept. 1, 1944 sustained shell fragment wounds of his right arm with a compound fracture of the right humerus. Following débridement a cast was applied and 500 cc. of plasma was administered. Convalescence was satisfactory and he was eventually admitted to this hospital November 28. He was referred to the gastrointestinal section for consultation on December 29 because of nausea, anorexia and upper abdominal distress of one month's duration. The only significant finding was a decidedly tender liver the firm lower edge of which was palpable 2 fingerbreadths below the costal border. The spleen could not be felt. Repeated determinations revealed that serum bilirubin ranged between 1.0 and 1.3 mg. per hundred cubic centimeters and urinary urobilinogen was elevated. Cephalin flocculation and hippuric acid excretion (oral and intravenous tests) were normal. Complete investigation of the gastrointestinal tract, including a cholecystogram, proved normal. He was given a diet high in carbohydrates and proteins with limitation of fat and showed rapid symptomatic improvement, although after three weeks the liver was still tender but barely palpable.

Too much reliance must not be placed on liver function tests in the diagnosis of mild hepatitis of short duration. It has been amply demonstrated that even in cases with jaundice the clinical features of subacute hepatitis were not directly or precisely correlated with the laboratory findings.

MANAGEMENT

Whenever possible patients were transferred to the gastrointestinal section for observation and treatment until at least clinical jaundice had subsided. No supplementary vitamin therapy was prescribed, sole reliance for nutritive requirements being placed on adequate carbohydrate and protein intake. Of late a modified Varco diet has been employed to advantage, using gastric intubation if indicated. In combating hypoproteinemia, however, concentrated serum albumin has given gratifying results unattended by any reactions noted with plasma or blood. Intravenous glucose and saline solution were rarely indicated. Surgical procedures were delayed until jaundice had receded and normal liver function had recovered in large measure. Jaundice per se was not considered an indication for absolute bed rest, and all patients were encouraged to partake of mild activity as the disease showed signs of subsiding. Convalescence appeared to proceed as rapidly in the ambulatory group as in those confined to bed because of casts or traction appliances.

COMMENT

Since blood products are administered as an emergency and frequently life saving measure, it is fortunate that the sequelae herein reported have thus far been unattended by any deaths despite the extreme initial cellular damage produced in the liver.

Pooling of plasma probably increases considerably the incidence of jaundice among the recipients. However, this procedure has been recommended to diminish the titers of isoagglutinins mainly by dilution and to some extent by action of group substances in neutralizing isoagglutinins, thus permitting universal use of plasma regardless of blood grouping. Hence the method employed to avoid initial severe post-transfusion reactions serves to increase the incidence of delayed jaundice. It is believed that the latter is the less objectionable, since severe reactions coming at a time when the recipient is in a precarious state might prejudice his chances of survival and interfere with urgent surgical procedures. An alternative to pooling would be the addition of purified solutions of group substances to plasma as suggested by Witebsky.[12] The use of plasma of the same group as the patient is obviously impossible in battlefield emergencies. Unfortunately skin tests to determine the sensitivity of the recipient to the icterogenic serum have been unsuccessful. While it has been demonstrated that ultraviolet radiation renders this agent innocuous, this seems unpractical for use on a large scale.

The most promising approach to the problem is the recent success attained by Stokes and Neefe[13] in preventing and attenuating infectious hepatitis by intramuscular injection of gamma globulin in subjects exposed to the disease. As most effective results were obtained by early injection, addition of gamma globulin to pooled plasma prior to its use or administering it early in the incubation period of jaundice to all individuals who have received plasma warrants trial as a prophylactic measure.

Oliphant[1] found that the jaundice producing agent is present in the blood during the preicteric stage but not after two and one-half months following disappearance of jaundice, and somewhat similar findings were obtained by MacCallum and Bauer.[14] This indicates that blood donors who constitute the greatest menace are those in the preicteric stage, or with hepatitis unattended by jaundice, as obviously individuals who have recently recovered from jaundice are not accepted at Red Cross blood banks. In view of the widespread incidence of infectious hepatitis, a transient "healthy carrier" state might exist among some volunteer blood donors and detection of such depositors would be impossible.

It has been repeatedly stressed that prevention would be aided by recording the lot number of each flask of plasma at the time of its use, thus permitting ultimate withdawal of contaminated batches. This method was found practicable with yellow fever and measles vaccine and may be applied to blood and plasma as employed in civilian hospitals. The problem presented by this discussion is more complex, since multiple transfusions are frequently given within a few days in the course of evacuation from first aid stations to the rear, and, in view of the wide variation of the incubation period, it would be extremely difficult to incriminate any one lot. However, valuable information could be obtained from records of patients receiving but a single transfusion, as even if the entire lot of plasma had been exhausted when it fell under suspicion the source of contamination might be traced.

Observations here suggest that quantitative bilirubin determinations be performed routinely on all patients who have received plasma or blood from doubtful sources at monthly intervals from the third to the sixth month after transfusion. This procedure is considered to be of more than academic interest since hepatitis "sine ictero" might result in sequelae as disabling as hepatitis

12. Witebsky, E.; Klendshoj, N., and Swanson, P.: Preparation and Transfusion of Safe Universal Blood, J. A. M. A. **116**:2654-2656 (June 14) 1941.

13. Stokes, Joseph, Jr.; and Neefe, J. R.: The Prevention and Attenuation of Infectious Hepatitis by Gamma Globulin, J. A. M. A. **127**: 144-145 (Jan. 20) 1945.

14. MacCallum, F. O., and Bauer, D. J.: Homologous Serum Jaundice Transfusion Experiments with Human Volunteers, Lancet **1**: 622-627 (May 13) 1944.

with jaundice. Unless the etiology is established at the outset, its recognition at a later stage may be extremely difficult.

While this series represents the largest reported to date of hepatitis resulting from the therapeutic use of blood or plasma, it is likely that this syndrome will be encountered and recognized more frequently in the future. Many cases which belong in this category have hitherto been erroneously considered infectious hepatitis. On the other hand, rigid criteria for diagnosis of homologous serum jaundice should be established lest the onset of hepatitis in all battle casualties be considered related to blood products received following shock and hemorrhage. Nevertheless with mounting casualties necessitating the use of pooled plasma on an ever increasing scale, it is likely that, with the exception of epidemic hepatitis, transfusions may constitute the largest single cause of acute hepatitis with jaundice until a method is devised for either detecting donors harboring the agent or for rendering the latter innocuous by treating the plasma prior to use.

SUMMARY

1. Thirty-two patients evacuated from overseas developed jaundice either en route to or following admission to an inland general hospital. All had received plasma or blood transfusions nine to eighteen weeks previously.

2. Evidence strongly suggests that the parenteral blood products acted as a vehicle for the icterogenic agent.

3. Serial laboratory studies corroborated the clinical impression that the resultant hepatitis was primarily parenchymatous.

4. Despite hepatomegaly, intense icterus and almost uniform laboratory evidence of derangement of the liver function, the clinical picture did not reflect the severe hepatic damage in the acute phase.

5. Subclinical hepatitis resulting from homologous serum may pass completely unrecognized because of absence of jaundice.

6. Quantitative van den Bergh estimation should be determined at monthly intervals from the third to the sixth month following receipt of pooled plasma as a simple method of uncovering latent hepatitis.

7. Since persons with a history of recent jaundice are not accepted as volunteer donors at blood banks, it is suggested that the icterogenic agent may be transmitted by subjects in the preicteric phase of infectious hepatitis or by "healthy carriers."

8. Because of multiple transfusions administered at successive medical installations in the course of evacuation, the problem of tracing the contaminated plasma responsible for this complication is extremely complex. Nevertheless, valuable information might be obtained in tracing the source of contamination if plasma lot numbers were recorded immediately following use.

9. The prophylactic use of gamma globulin either by addition to pooled plasma or by intramuscular injection subsequent to transfusion appears to warrant trial.

10. Apart from epidemic hepatitis, transfusions may constitute the commonest cause of jaundice occurring in the armed forces at present.

THE HYPEREMIA EFFECT OF GONADOTROPINS ON THE OVARY

AND ITS USE IN A RAPID PREGNANCY TEST

BERNHARD ZONDEK, M.D.
FELIX SULMAN
AND
RIVKA BLACK
JERUSALEM, PALESTINE

The hormone pregnancy test is based on the following facts:

1. The gonadotropic reactions of the ovary in infantile rodents:[1] anterior pituitary reaction I, follicle ripening and induction of vaginal estrus; anterior pituitary reaction II, hyperemization of the ovary and follicle hemorrhage (blood dots); anterior pituitary reaction III, formation of corpora lutea.

2. The production and excretion in large amounts of gonadotropic hormone in pregnant women, monkeys and equines (but not in other mammals).[2] Immediately after nidation of the egg in the endometrium, production of the gonadotropic hormones occurs explosively in such great quantities that even small amounts of blood or urine suffice to induce the aforementioned gonadotropic reactions. The hormone appears in lower concentrations in the blood than in the urine.

APPLICATION OF THE ORDINARY HORMONE PREGNANCY TEST AND ITS MODIFICATIONS

The ordinary hormone pregnancy test and its modifications are carried out most dependably on the ovaries of infantile rodents. The three gonadotropic reactions are induced by two different factors: the follicle stimulating hormone yielding anterior pituitary reaction I, and the luteinizing hormone yielding anterior pituitary reactions II and III. In developing the pregnancy test it was found that only anterior pituitary reactions II and III may be used for an accurate evaluation of the test; viz., only the presence of large amounts of the luteinizing hormone indicates pregnancy. Increased quantities of the follicle stimulating hormone may be excreted in the urine in conditions other than pregnancy (polyhormonal amenorrhea, climax, tumor); hence an error of about 10 per cent would arise through the application of anterior pituitary reaction I for the diagnosis of pregnancy, thus upsetting the practical value of the reaction. The anterior pituitary reaction I, as will be shown later, is however of diagnostic importance in certain cases of disturbed pregnancy.

As we shall see, not all infantile rodents react in the same manner to chorionic gonadotropin. A most striking reaction, easily distinguished with the naked eye, is the induction of the blood dot which protrudes from the ovary. Infantile mice were chosen for the original hormone pregnancy test because of the ease with which blood dots are found in this species. The test animals are injected subcutaneously over a forty-eight hour period with 1.8 to 2.4 cc. of urine (six injections of 0.3 or 0.4 cc.) and are opened for inspection ninety-six hours later. The test thus takes four days. This delay is undoubtedly a shortcoming of the method.

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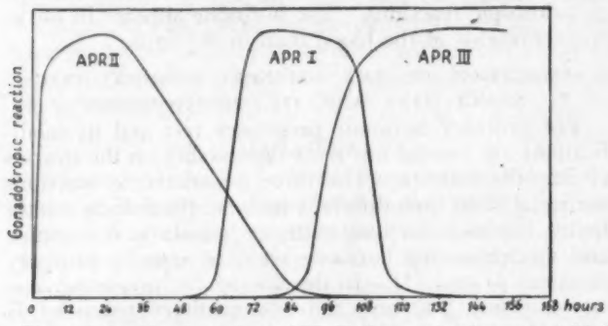
In view of the difficulties of international communication, the authors have not read the proof of this article.
From the Gynecological-Obstetrical Department, Rothschild Hadassah University Hospital, and the Hormone Research Laboratory, Hebrew University, Jerusalem, Palestine.
1. Zondek, B.: Ztschr. f. Geburtsh. u. Gynäk. **90**: 378, 1926. Zondek, B., and Aschheim, S.: Arch. f. Gynäk. **130**: 27, 1927.
2. Aschheim, S.: Klin. Wchnschr. **7**: 1453, 1928. Zondek, B., ibid. **7**: 1404, 1928.

MODIFICATIONS OF THE ORDINARY HORMONE PREGNANCY TEST

Repeated attempts have been made to shorten the duration of the reaction. In 1930 the senior author [3] described a rapid pregnancy test in which precipitation of the gonadotropin from pregnancy urine with alcohol was employed. The precipitate was washed with ether and later dissolved in water. This method affords the injection of larger quantities of hormones (the equivalent of up to 14 cc. of urine in every mouse) and the result could be ascertained in fifty hours. This method was further studied and recommended by Eberson and Silverberg [4] and by Latzka.[5] The disadvantage of this rapid method is that the precipitation of the hormone takes several hours and complicates the procedure. Furthermore, the precision of the method does not approximate that of the original hormone pregnancy test.

An important contribution was the modification proposed by Friedman,[6] in which the urine is injected intravenously into rabbits instead of subcutaneously into mice. This reaction can be read in thirty-six to forty-eight hours later from the blood dots of the ovary. Hence, in this method too the anterior pituitary reaction II serves as the basis of the test. The shortcoming of this modification lies in the fact that the rabbits



Time relationship of reactions: APR II (hyperemia of ovary), APR I (estrus) and APR III (formation of corpora lutea).

have to be kept in separate cages for four weeks before beginning the test, so as to obviate any attempts at mating, which may cause ovulation and so falsify the reaction. Good results have also been obtained with infantile rabbits, but this requires well organized breeding, as only animals weighing more than 800 Gm. give reliable reactions. We have found that in the subtropical climate of Palestine the rabbit test may be faulty. This is especially true in the spring and summer months during spells of sirocco (hamsin), as this hot dry wind may cause spontaneous formation of follicle hemorrhages (anterior pituitary reaction II).

THE HYPEREMIA EFFECT OF CHORIONIC GONADOTROPIN AS A PREGNANCY TEST

Zondek and Aschheim [7] showed that in infantile rodents strong hyperemia of the ovary and follicle hemorrhages (anterior pituitary reaction II) may be evoked by the implantation of pituitary anterior lobe or placenta and by the injection of blood or urine from pregnant women. This is accompanied by anterior pituitary reaction I, which evokes vaginal estrus (cornification) and luteinization of the ovary (anterior pituitary reaction III). It is interesting to note that the ovaries of different species of rodents react differently toward the administration of gonadotropic hormone.

In the infantile mouse the ovary is normally somewhat hyperemic; this hyperemia is enhanced by gonadotropic hormone, and the formation of blood dots is brought about. The infantile rat reacts otherwise. In this animal the ovary is anemic and gonadotropins scarcely provoke blood dot formation, but at an early stage extreme hyperemia of the whole ovary takes place, so that it stands out in a most characteristic way from the pale tubes and the uterus. In the infantile rabbit the ovary is also anemic but, in contrast to the rat, blood dots appear regularly, whereas the hyperemia reaction of the whole ovary is absent. Common to the three rodents is the stimulation by gonadotropin resulting in formation of corpora lutea (anterior pituitary reaction III). Hence the blood dot (anterior pituitary reaction II) is not a necessary feature of the gonadotropin reaction. If the blood dot is to be used as the indicator for gonadotropin, the mouse or rabbit is the most suitable test object, whereas if hyperemia is to be used the rat is most fitting.

TIME FACTOR

The gonadotropic reactions of the ovary (anterior pituitary reactions I-III) appear at different time intervals in the rat. Estrus appears between the sixtieth and the eightieth hour and corpus luteum formation between the eighty-sixth and the one hundred and twelfth hour. The hyperemia of the ovary is the first reaction, beginning in two hours (with pituitary gonadotropin even in fifteen minutes and with pregnant mare blood gonadotropin after three to four hours); it has its peak at the twenty-fourth hour and disappears within thirty-six to forty-eight hours, as shown in the accompanying chart. Thus it is obvious that the minimum period for hyperemia to set in is very short.

RELATION BETWEEN HYPEREMIA UNIT, ESTRUS UNIT AND CORPUS LUTEUM UNIT

We have designated as 1 hyperemia unit that amount of gonadotropic hormone which induces hyperemia of the whole ovary in an infantile female rat within twenty-four hours. We have investigated the quantitative relations of the hyperemia unit, the estrus unit and the corpus luteum unit in the rat with a single injection and the reactions were read as follows: for the hyperemia unit, twenty-four hours later, for the estrus unit in ninety-six hours and for the corpus luteum unit in one hundred and twenty hours. We also determined these values for three gonadotropins: (*a*) chorionic gonadotropin from pregnancy urine, (*b*) pregnant mare blood gonadotropin and (*c*) pituitary gonadotropin (sheep hypophysis). We shall here give only a summary of these examinations as carried out on 3,000 infantile female rats.

A puzzling fact was encountered in that the hyperemia unit varies considerably with different gonadotropins. The most active was pituitary gonadotropin, which evokes hyperemia with one tenth to one twentieth of the quantity of hormone necessary to induce vaginal estrus or luteinization. The most ineffective is pregnant mare blood gonadotropin, of which ten times the amount of hormone is needed for hyperemization as for estrus. With chorionic gonadotropin from pregnancy urine, the quantity of hormone needed for the hyperemia effect is intermediate: hyperemia is brought

3. Zondek, B.: Klin. Wchnschr. **9**: 964, 1930.
4. Eberson, F., and Silverberg, M. H.: Anterior Pituitary Hormone in Urine, J. A. M. A. **96**: 2176 (June 27) 1931.
5. von Latzka, A.: Klin. Wchnschr. **12**: 1906, 1933.
6. Friedman, H. M.: Am. J. Physiol. **90**: 617, 1929; Am. J. Obst. **21**: 405, 1931.
7. Zondek and Aschheim, footnotes 1 and 2.

on with the same amount which evokes estrus, whereas for luteinization three times the amount is necessary.

What conclusions may be drawn from these facts? It is possible that the hyperemia factor, whose effect is rapid and limited to a certain time interval (one-fourth to forty-eight hours), is a special factor, viz. a third hormone. This question can be decided only with experiments on hypophysectomized animals, which we intend to carry out. It is also possible that hyperemia is evoked by optimal proportions of follicle stimulating hormone and luteinizing hormone in the injected preparation. Chorionic gonadotropin contains preponderantly luteinizing hormone and pregnant mare blood gonadotropin chiefly follicle stimulating hormone, whereas pituitary gonadotropin contains follicle stimulating hormone and luteinizing hormone. Hence pituitary gonadotropin can evoke anterior pituitary reaction II with a minimum dosage in a minimum of time. On the other hand, pregnant mare blood gonadotropin containing follicle stimulating hormone and chorionic gonadotropin containing only luteinizing hormone must be given in larger doses.

It seems that hyperemia is evoked mainly by luteinizing hormone and that follicle stimulating hormone has only an augmentative effect. This would be in agreement with the conception of Zondek (1931-1935)[8] that the follicle hemorrhage, which constitutes the peak reaction of hyperemia, arises from a combined effect of follicle stimulating hormone and luteinizing hormone. The important fact which emerges from this discussion is that with pregnancy urine gonadotropin the hyperemia hormone pregnancy test is evoked with one third the amount of hormone that is necessary for luteinization. This renders the hyperemia hormone pregnancy test especially sensitive for the diagnosis of pregnancy.

RESULTS WITH THE HYPEREMIA HORMONE PREGNANCY TEST

There have been repeated attempts to use the hyperemia effect of chorionic gonadotropin as a pregnancy test. The first experiments were reported by Reiprich[9] and by Zondek.[10] Reiprich[9] injected infantile rats with quantities of urine as large as 10 to 14 cc. and found a positive reaction in twenty-four to thirty hours. Zondek[10] observed that such large amounts of urine are apt to give false results, especially in cases in which the follicle stimulating hormone content of the urine is high (menopause and tumors). The hyperemia reaction was further studied and employed for the diagnosis of pregnancy by the Walkers[11] and Falls, Kelso,[12] Frank and Berman,[13] the Salmons, Geist, Frank and Poole,[14] Kupperman and his associates,[15] Kaminester,[16] Kline[17] and Farris.[18]

For an exact diagnosis of pregnancy, special emphasis should be laid on the right dose, since the injection of excessive amounts of urine results in positive reactions from nonpregnant women with functional disturbances involving increased excretion of follicle stimulating hormone. When, for example, we injected 10 cc. of pregnancy urine, as proposed by Frank and Berman,[13] we obtained false positives, from which we concluded that the dose was too high. Generally, 20,000 rat units (estrus units) of gonadotropin is excreted in 1 liter of the urine of early pregnancy, so that 1 cc. contains 20 estrus units. The excretion of luteinizing hormone is about 5,000 to 10,000 rat units per liter. Since the estrus unit equals the hyperemia unit, it is obvious that 1 cc. contains 20 hyperemia units. We have found the most practical dose to be 4 cc. of pregnancy urine. This is given to the infantile female rat in two injections of 2 cc. each at an interval of one hour. The site of injection is the subcutis of the neck.

TABLE 1.—*Results of the Two, Six and Twenty-Four Hour Hyperemia Tests in 200 Cases Compared with the Ordinary Hormone Pregnancy Test*

Diagnosis	Number of Cases	2 Hour Test		6 Hour Test		24 Hour Test		Ordinary Hormone Pregnancy Test		
								Pos.	Neg.	
		Correct	False	Correct	False	Correct	False	A—Pos. B—Pos.	A—Pos. B—Neg.	A—Neg. B—Neg.
Early pregnancy (1st to 3d months)	80	53	27	75	5	80	0	80	0	0
Late pregnancy (4th to 9th months)	13	11	2	13	0	13	0	13	0	0
Extrauterine pregnancy:										
Luteinizing hormone (B) positive	4	1	3	3	1	4	0	4	0	0
Follicle stimulating hormone (A) positive	4	4	0	4	0	4	0	0	4	0
Abortion:										
Luteinizing hormone (B) positive	4	3	1	3	1	4	0	4	0	0
Follicle stimulating hormone (A) positive	9	9	0	9	0	9	0	0	9	0
Benign tumors	13	13	0	13	0	12	1*	0	6	7
Malignant tumors	10	10	0	10	0	10	0	0	3	7
Menopause	7	7	0	7	0	7	0	0	4	3
Polyhormonal disturbances	19	19	0	19	0	18	1†	0	13	6
Secondary amenorrhea (½-10 years)	10	10	0	10	0	10	0	0	0	10
Normal persons (including cases of secondary amenorrhea of short duration)	27	27	0	27	0	27	0	0	0	27
Total	200	167	33	193	7	198	2	101	39	60

* A case of myoma; the ordinary hormone pregnancy test was negative in all 5 mice injected, but prolan A was positive. In the 24 hour hyperemia test 1 of the 3 rats employed reacted positively. The 2 and 6 hour test was negative.
† A case of corpus luteum persistens. The patient had a negative ordinary hormone pregnancy test, but the urine contained 500 M. U. prolan A and 250 M. U. prolan B. The latter finding could not be revealed by the ordinary hormone pregnancy test since it only indicates the presence of more than 417 M. U. prolan B. The hyperemia test was negative after 2 and 6 hours, but positive in all 3 rats used for the 24 hour test.

8. Zondek, B.: Die Hormone des Ovariums und des Hypophysenvorderlappens, ed. 1, Berlin, Julius Springer, 1931, p. 131; ed. 2, 1935, p. 202.
9. Reiprich, W.: Klin. Wchnschr. **12**: 1441, 1933.
10. Zondek, B.: Hormone des Ovarium und des Hypophysenvorderlappens, p. 563.
11. Walker, T. F., and Walker, Dora V. H.: Modification of Aschheim-Zondek Test, J. A. M. A. **111**: 1460 (Oct. 15) 1938.
12. Kelso, R. E.: Am. J. Clin. Path. **10**: 293, 1940.
13. Frank, R. T., and Berman, R. L.: Am. J. Obst. & Gynec. **42**: 492, 1941.
14. Salmon, U. J.; Geist, S. H.; Salmon, A. A., and Frank, I. L.: J. Clin. Endocrinol. **2**: 167, 1942. Salmon, U. J.; Geist, S. H.; Poole, C. S., and Salmon, A. A.: Endocrinology (supp.) **30**: 1039, 1942.
15. Kupperman, H. S.; Greenblatt, R. B., and Noback, C. R.: J. Clin. Endocrinol. **3**: 548, 1943. Kupperman, H. S., and Greenblatt, R. B.: Georgia Univ. Hosp. Bull. **5**: 6, 1944.
16. Kaminester, S.: Am. J. Obst. & Gynec. **47**: 265, 1944.
17. Kline, B. S.: Salmon, Geist, Salmon, Frank Six Hour Rat Test for Pregnancy, American Medical Association Scientific Exhibit, Section on Obstetrics and Gynecology, Chicago, June 12-16, 1944.
18. Farris, E. J.: Am. J. Obst. & Gynec. **48**: 200, 1944. See also the editorial in the Journal of Clinical Endocrinology **4**: 410, 1944.

Up to now we have tested 300 cases. In 200 cases (table 1) the previous diagnosis was unknown and the results were vertified by the ordinary hormone pregnancy test carried out on infantile mice. In a further 100 cases (table 2) the urine samples were taken from patients in our department. In these cases the diagnoses from the clinical data were known to the senior author but not to the laboratory personnel. The cases studied, which are compiled in tables 1 and 2, include early pregnancy, late pregnancy, extrauterine pregnancy, abortion, benign and malignant tumors, the menopause, polyhormonal disturbances, primary and secondary amenorrhea, febrile infections and normal subjects. Patients with tumors were tested only when the type of the tumor could be verified by laparatomy (Z.). In order to ascertain the time interval at which the hyperemia reaction gives most exact results, the animals were killed two, six and from eighteen to twenty-four hours after injection. The results in our 300 cases (tables 1 and 2) were as follows:

TABLE 2.—*Results of the Hyperemia Test in 100 Cases of Known Diagnosis*

Diagnosis	Number of Cases	2 Hour Test		6 Hour Test		24 Hour Test	
		Correct	False	Correct	False	Correct	False
Early pregnancy (1st to 3d months)	18	12	6	17	1	18	0
Late pregnancy (4th to 9th months)	17	12	5	14	3	17	0
Extrauterine pregnancy	2	0	2	1	1	2	0
Febrile infections	4	4	0	4	0	4	0
Benign tumors	15	15	0	15	0	15	0
Malignant tumors	13	13	0	13	0	12	1*
Menopause	3	3	0	3	0	3	0
Primary amenorrhea	1	1	0	1	0	1	0
Polyhormonal disturbances	12	12	0	12	0	12	0
Normal persons (including secondary amenorrhea of short duration)	15	15	0	15	0	15	0
Total	100	87	13	95	5	99	1

* A case of pseudomyxoma ovarii. The hyperemia test was negative after two and six hours, but 1 of the 3 rats used for the twenty-four hour test reacted positively.

1. *Two Hour Test.*—Of 98 cases of early pregnancy (one to three months) 33 false results were obtained in which pregnancy was not diagnosed. Of 30 cases of late pregnancy (four to nine months) we obtained 7 false results. In all, there were thus 40 mistakes in 128 pregnancies, a 31.2 per cent error. It must, however, be emphasized that whenever the two hour test was positive the result was correct. In other words, the two hour test can be used only if the result is positive, whereas negative results cannot be evaluated. Positive reactions were never obtained with the urine of nonpregnant women, which is obvious since the test is uncertain even in the presence of great amounts of chorionic gonadotropin in pregnancy. In the whole series of 300 cases tested, which comprised patients in various conditions, we had 45 false results, i. e. a 15 per cent error.

2. *Six Hour Test.*—The results with the six hour test were much better. Here we had 11 false results out of 300 cases, i. e. an error of 3.7 per cent. Unfortunately, the source of error is much greater if only the cases of pregnancy are considered. Here we found 6 false results in 98 cases of early pregnancy, and 3 mistakes in 30 cases of late pregnancy. This gives 9 erroneous results in 128 cases of pregnancy, an error of 7.8 per cent. The six hour test is very reliable if it is positive but is inconclusive when negative. We are now going to improve its reliability.

3. *Twenty-Four Hour Test.*—There was a very great improvement with the twenty-four hour test. In 98 cases of early pregnancy and 30 cases of late pregnancy all the tests proved correct. This would mean a precision of 100 per cent. On the other hand, we had 3 false results with nonpregnant patients. These were (*a*) a case of myoma, (*b*) a case of pseudomyxoma ovarii and (*c*) a case of corpus luteum persistens. It is known that in such cases even the ordinary hormone pregnancy test may be positive. Hence in 300 cases we had 3 false positive results, an error of 1 per cent.

For clinical purposes it is usually quite sufficient to have a precise result within twenty-four hours. It is only rarely that the result is required urgently on the same day. In these cases the six hour test and even the two hour test may be tried. In such cases it should be made clear that the two and six hour tests can be used only if they are positive. If they are negative, pregnancy cannot be excluded and the correct answer can be given only within twenty-four hours.

Technic.—Our routine technic is as follows: We use 3 infantile female rats, 3 to 5 weeks old, weighing 20 to 25 Gm., for every examination. They receive 4 cc. of urine each in two injections of 2 cc. at an interval of one hour. Injections are given subcutaneously into the neck. One rat is killed after six hours and the other two are killed in twenty-four hours. The reaction is positive if hyperemia appears in at least one ovary of 2 different rats. As a rule all ovaries react similarly. The rats are killed with ether, chloroform or illuminating gas, opened and the uterine cornua lifted with a forceps. The ovaries are often covered with fat. In this case they should be turned and the fat is carefully teased away, any lesion being avoided which may cause hemorrhage. The ovaries may be inspected in bright daylight, in direct sunlight or by electric light. Comparison should be made with the color of the spleen or kidney. If the reaction is positive the ovaries are slightly brighter than these organs, nearly strawberry red. The hyperemia should extend to the whole ovary and not only to single follicles. The operator should be able to distinguish red clearly.

HYDATIDIFORM MOLE AND CHORIONEPITHELIOMA

The ordinary hormone pregnancy test has obtained special significance in the diagnosis of pathologic pregnancy. Following the demonstration that in hydatidiform mole excretion of gonadotropic hormone is greatly increased,[19] the quantitative determination of chorionic gonadotropin in the urine has become of special importance for differential diagnosis of hydatidiform mole and chorionepithelioma. There are even certain types of malignant tumors of the testis which may be diagnosed by means of the urine.[20] This was the first demonstration of diagnosis of malignant tumors through the urine, and it has even been possible to determine by this means the type of tissue from which the tumor originated.

In 2 cases of hydatidiform mole and 1 of chorionepithelioma we compared the hyperemia hormone pregnancy test in the rat with the ordinary hormone

19. Zondek, B.: Endokrinologie **5**: 425, 1929. Meyer, R.: Zentralbl. f. Gynäk. **54**: 430, 1930.
20. Zondek, B.: Chirurg **2**: 1072, 1930; Klin. Wchnschr. **11**: 274, 1932.

pregnancy test in the mouse. The urine was given in diluted form.[21]

CASE 1.—*Hydatidiform mole.* The ordinary hormone pregnancy test showed follicle ripening and induction of vaginal estrus (anterior pituitary reaction I), 1,000,000 mouse units per liter of urine; hyperemization of the ovary and follicle hemorrhage, with formation of corpora lutea (anterior pituitary reactions II and III), 500,000 mouse units. The hyperemia hormone pregnancy test showed ovarian hyperemia (anterior pituitary reaction II), 500,000 rat units.

CASE 2.—*Hydatidiform mole.* The ordinary hormone pregnancy test showed follicle ripening and induction of vaginal estrus (anterior pituitary reaction I), 200,000 mouse units per liter of urine; hyperemization of the ovary and follicle hemorrhage, with formation of corpora lutea (anterior pituitary reaction II and III), 100,000 mouse units. The hyperemia hormone pregnancy test showed anterior pituitary reaction II, 200,000 rat units.

CASE 3.—*Chorionepithelioma.* The ordinary hormone pregnancy test showed follicle ripening and induction of vaginal estrus (anterior pituitary reaction I), 6,000,000 mouse units per liter of urine; hyperemization of the ovary and follicle hemorrhage, with formation of corpora lutea (anterior pituitary reactions II and III), 3,000,000 mouse units. The hyperemia hormone pregnancy test showed anterior pituitary reaction II, 3,000,000 rat units per liter of urine. In this case gonadotropin excretion was especially high because the patient had multiple metastases.

These examinations indicate that the hyperemia hormone pregnancy test may also be used for the diagnosis of hydatidiform mole and chorionepithelioma. Unfortunately, we have not yet been able to test more than 3 cases because of their relative rarity. It should be stressed, however, that in the case of chorionepithelioma we obtained a positive hyperemia hormone pregnancy test with only 0.0003 cc. of urine. For the diagnosis of hydatidiform mole the excessive excretion of the follicle stimulating hormone is of diagnostic value [22] and it is questionable whether the ordinary hormone pregnancy test can be dispensed with for this purpose.

IS THE HYPEREMIA TEST SUFFICIENT?

The hyperemia test in the rat is adequately accurate for the determination of pregnancy but is not sufficient for the examination of disturbed pregnancy (ruptured extrauterine pregnancy, threatened, incomplete and missed abortion). In these cases the titer of chorionic gonadotropin in the urine is on the decrease; the luteinizing hormone ("prolan B") is not detectable any more, whereas the follicle stimulating hormone ("prolan A") still is. From the presence of the follicle stimulating hormone the clinician can deduce that there is still some placental tissue in contact with the circulation. In table 1 are shown 4 cases of disturbed extrauterine pregnancy in which the A reaction was positive. This was reason enough for us to suspect a tumor protruding near the uterus to be an extrauterine pregnancy, which was confirmed by laparatomy (Z). Out of 13 cases of abortion 9 were A positive, which also proved to be of importance for diagnosis. Furthermore, it should be remembered that the presence of the follicle stimulating hormone is an important clue in cases of polyhormonal disturbances and malignant tumors. In hydatidiform mole and chorionepithelioma the same holds true, as already mentioned.[22]

In the light of our recent experience with the pregnancy test, the importance of knowing the history of the patient cannot be overemphasized. When it is a question of the simple determination of pregnancy, the hyperemia hormone pregnancy test in the rat, as described, is sufficient. If there is a suspicion of disturbed pregnancy, e. g. bleeding of uncertain cause in a woman, the ordinary hormone pregnancy test cannot be dispensed with. It is especially valuable in the diagnosis of disturbed extrauterine pregnancy and the differential diagnosis between bleeding from soft myoma and from disturbed intrauterine pregnancy.

We are at present developing the follicle stimulating hormone (A) test in the rat, so that in future we hope to be able to use the rat test also as an alternative in cases of disturbed pregnancy. We have for this purpose added 2 more rats to the 3 rats used for the six to twenty-four hour test. They are opened after four days. One receives 2 cc. of urine twice and the other 1 cc. twice administered at a one hour interval. They serve to check the six to twenty-four hour test and to determine excretion of follicle stimulating hormone. (The results with this technic have been based until now on only 80 patients.) When both rats give positive reactions for the luteinizing hormone (anterior pituitary reaction III) they confirm pregnancy in the patient, and when both are negative they confirm the absence of pregnancy. When both are positive for the follicle stimulating hormone only (vaginal estrus, anterior pituitary reaction I) the possibility is hinted at of functional disturbances (polyhormonal amenorrhea, climax), tumors and disturbed pregnancy (ruptured extrauterine pregnancy, threatened, missed or incomplete abortion). When the rat with the larger dose (2 cc. twice) is B positive and that with the smaller dose (1 cc. twice) is A positive but B negative, a significant decrease in the concentration of chorionic gonadotropin is indicated. This occurs mostly in cases of disturbed pregnancy, as mentioned, and occasionally in tumors. This finding should stimulate the clinician to make another proper examination of the patient.

SUMMARY

1. Chorionic gonadotropin brings on, in the ovary of rodents, the well known anterior pituitary reactions (I-III). The earliest of these reactions is hyperemia of the ovary of the infantile rat. Hyperemia occurs as early as two to six hours after injection, reaches its peak after twenty-four hours and disappears in forty-eight hours. Hyperemia is the first stage of anterior pituitary reaction II, its second stage being the follicle hemorrhage (blood dot).

2. Hyperemia of the ovary does not appear in all rodents in a similar way. The infantile rat is the best reactor, whereas the infantile mouse and rabbit cannot be used.

3. As regards the hyperemia effect (anterior pituitary reaction II) in the rat, the gonadotropic hormone from the anterior pituitary lobe is the most active, pregnant mare blood gonadotropin is the least active, and the activity of chorionic gonadotropin from pregnancy urine lies in between. With chorionic gonadotropin hyperemia may be produced with the same amount of hormone which evokes vaginal estrus; the amount used for luteinization is about three times as great.

4. Hyperemia is apparently evoked by the luteinizing hormone, while the follicle stimulating hormone seems to play a role as an augmenting factor.

21. In our animals the hyperemia unit (anterior pituitary reaction II in the rat after one injection) approximately equals the blood dot and luteinizing unit (anterior pituitary reactions II and III in the mouse after six injections), but it is possible that this relation differs with different strains of animals.

22. Zondek, B.: Gonadotropic Hormone in Diagnosis of Chorionepithelioma, J. A. M. A. **108**: 607 (Feb. 20) 1937; J. Obst. & Gynaec. Brit. Emp. **49**: 397, 1942.

5. The hyperemia hormone pregnancy test in the infantile rat may be used for the early determination of pregnancy. The time factor plays a decisive part. In the two hour test the reaction is extremely unreliable, so that pregnancy can be diagnosed in only 69 per cent of the cases and with the six hour test in 92.2 per cent, whereas the twenty-four hour test is reliable in 100 per cent of the positive cases. There may be, however, occasional positive results with the twenty-four hour test with nonpregnant patients (tumors). They bring the error in the twenty-four hour test to 1 per cent (tested in 300 cases). The two and six hour tests can be relied on if the result is positive. When it is negative, the result of the twenty-four hour test must be awaited.

6. The hyperemia test in the infantile rat is suitable in undisturbed pregnancies. In cases of disturbed pregnancy (ruptured extrauterine pregnancy, threatened, incomplete or missed abortion, hydatidiform mole and chorionepithelioma) the ordinary hormone pregnancy test cannot be dispensed with for the time being.

7. The hyperemia hormone pregnancy test in rats is based on the appearance of anterior pituitary reaction II, which is one of the decisive principles used in the ordinary hormone pregnancy test.

Clinical Notes, Suggestions and New Instruments

THE PREPARATION OF POTENT ANTI-RH TYPING SERUMS BY INJECTION OF RH POSITIVE BLOOD INTO PREVIOUSLY ISOIMMUNIZED INDIVIDUALS

JOSEPH M. HILL, M.D.; SOL HABERMAN, PH.D., AND ALFONSO VELEZ OROZCO, M.D.
WITH THE TECHNICAL ASSISTANCE OF
SHIRLIE TALLAL TRUBY, B.A.
DALLAS, TEXAS

The experience of the William Buchanan Blood, Plasma and Serum Center with routine Rh typing since May 1944 has led to the conviction that this additional routine service is essential for transfusions of maximum safety.[1] It also appears that infant mortality due to hemolytic disease of the newborn (erythroblastosis fetalis) can be decreased through the additional information acquired from routine Rh typing of all obstetric cases and newborn infants; also routine Rh typing should be available to military services, first, because in the great number of whole blood transfusions now being given there is increased opportunity for Rh negative individuals to be sensitized so that later transfusions may be dangerous and, second, the necessity for multiple transfusions following severe battle injuries increases the opportunities for isoimmunization with the Rh antigen and resultant transfusion accidents.

The chief problem in routine Rh typing is to secure a sufficient and continuing source of potent antiserums. Initially a routine Rh typing service was established in this center largely on the basis of 200 cc. of very high titer plasma obtained from the mother of an erythroblastotic child. With a titer of 1:640 this plasma was theoretically adequate to perform approximately 80,000 tests. Actually, demands from other institutions and quantities used for investigative purposes together with the steady drain of routine testing (over 8,000 tests to March 1945) indicated that some additional or more potent source of Rh antiserums was necessary. We believe that the injection of Rh positive cells in properly selected previously isoimmunized individuals as described in this report may answer this need.

The necessity for using human sources for Rh antiserums results from the fact that sufficiently potent serums are difficult to produce in animals, are small in quantity and, because of low titer, cannot be increased appreciably by dilution. Landsteiner and Wiener [2] first produced an antibody in rabbit serum by intravenous injection of Macacus rhesus erythrocytes. This antibody was designated anti-Rh. Later, Landsteiner and Wiener [3] described the production of antiserums by injection of Rhesus red cells into guinea pigs. Only occasional pigs produced serums of effective potency, and all workers attempting to obtain serum by injection of animals have had difficulty in obtaining high titer useful antiserums. Our own results with animals have thus far been equally disappointing. By contrast, human antiserums obtained from mothers of infants with hemolytic disease have often proved very satisfactory. In fact, even in the original case of isoimmunization reported by Levine and Stetson [4] the mother's serum could be used to differentiate between compatible and incompatible donors, 21 out of 104 being compatible. It seemed logical to go a step further and by intravenous injection of Rh positive cells to raise the titer of the serum from mothers delivered of erythroblastotic infants. This procedure could be used either shortly after delivery to produce higher titers or at later intervals to produce satisfactory antiserums through the anamnestic reaction. Obviously, the possible risks incurred by such blood donors had to be carefully weighed and the decision made in consultation with the patient on an individual basis.

REPORT OF CASES

CASE 1.—A white woman aged 22 of type A, Rh negative, was admitted to the obstetric service Dec. 10, 1944 with the history of an uneventful delivery of 1 previous normal boy eighteen months before (Rh positive by present tests). On the day of admission an apparently normal Rh positive male child was delivered. One day later this baby developed icterus with erythroblastosis but recovered after transfusions of Rh negative blood. The mother showed Rh antibodies in a titer of 1:4 with a positive blocking test.[5] A series of small intravenous injections of Rh positive blood was started six days after delivery. The initial dose consisted of 1 cc. of the infant's cells (type A, Rh positive) in 1 cc. of citrate saline solution. Two days later the same procedure was repeated and a sample of blood was taken for titration. Positive agglutination was found at 1:8 dilution, doubtful at 1:16. Blocking antibodies were demonstrated, however, at 1:16 and doubtful at 1:32. An additional injection of 1 cc. of baby's blood was given on the next day and a titration one day later showed an antibody titer of 1:8 but no blocking antibody. Four days later (eight days after the initial blood injection) an injection of 4 cc. of Rh positive blood and 1 cc. of citrate saline solution was given in the morning. A moderate febrile reaction occurred the same afternoon with temperature maximum of 101 F. The blood for this last injection was not taken from the infant but from a person whose erythrocytes agglutinated most strongly with the antibodies already present in the patient's serum. A titration three days after this last injection showed a titer of 1:2,048 and a blocking antibody titer of 1:8 using type O, Rh positive cells of one of us (S. T. T.). A titration with different type A, Rh positive erythrocytes (E. B.) showed a

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From the William Buchanan Blood, Plasma and Serum Center of Baylor Hospital and the Department of Pathology, Southwestern Medical College.

1. Hill, J. M., and Haberman, Sol: Analysis of Routine Rh Typing in Large Maternity and Transfusion Service, to be published.

2. Landsteiner, K., and Wiener, A. S.: An Agglutinable Factor in Human Blood Recognized by Immune Sera for Rhesus Blood, Proc. Soc. Exper. Biol. & Med. **43**: 225 (Jan.) 1940.

3. Landsteiner, K., and Wiener, A. S.: Studies on an Agglutinogen (Rh) in Human Blood Reacting with Anti-Rhesus Sera and with Human Isoantibodies, J. Exper. Med. **74**: 309 (Oct.) 1941; Tests for the Rh Factor with Guinea Pig Immune Sera, Proc. Soc. Exper. Biol. & Med. **51**: 313 (Dec.) 1942.

4. Levine, P., and Stetson, R. E.: An Unusual Case of Intra-Group Agglutination, J. A. M. A. **113**: 126 (July 8) 1939.

5. Wiener, A. S.: A New Test (Blocking Test) for Rh Sensitization, Proc. Soc. Exper. Biol. & Med. **56**: 173 (June) 1944.

titer of 1:512 with no blocking antibodies demonstrated with these red cells. Two days after this test (five days after the last and thirteen days after the initial injection) 500 cc. of blood was collected from this patient and then transfusion of 1,000 cc. of Rh negative blood was given to compensate for blood drawn and for a slight anemia.

CASE 2.—A white woman aged 29 of type A, Rh negative, was admitted to the obstetric service with the history of having had 1 normal male child approximately three years earlier. A full term Rh positive female infant was born jaundiced and anemic but responded well to transfusions of Rh negative blood and recovered. The mother showed antibodies in her serum at a dilution of 1:1,280. Sufficient blood was collected from the patient before leaving the hospital to yield 200 cc. of plasma. This plasma, having a specificity of approximately 85 per cent (i. e. this plasma agglutinates the erythrocytes of 85 per cent of the general population) was used as the basis for starting our routine Rh typing service.

The patient returned eighteen months later and testing of her serum showed that an anti-Rh titer of 1:64 was still present. Injections of Rh positive blood to produce a higher titer typing serum was agreed on after discussion of the procedure and its consequences with the volunteer. An initial intravenous injection of 2 cc. of type O, Rh positive cells (E. W.) mixed with 1 cc. of citrate saline solution was given. On the next day a similar dose of Rh positive, type O cells (S. T. T.) was given. A test titration of the fifth day showed a titer of 1:128 (against S. T. T. cells). On the eighth day a sample was taken for titration and 5 cc. of Rh positive blood (S. T. T.) mixed with 20 cc. of saline citrate solution was slowly given. No ill effects were noted. The serum from this sample titrated at 1:512 against known Rh_o' and Rh_o'' cells. Another test titration on the tenth day showed a titer of 1:640. Blood had to be collected on the twelfth day because the patient had to leave the city. At this time 750 cc. of blood was collected and replaced by a transfusion of 500 cc. of Rh negative blood without reaction. This blood yielded 325 cc. of serum with a titer of 1:2,560, which dropped to 1:2,048 (against known Rh_o', Rh_o'' and S. T. T. cells) after removal of anti-B agglutinins by absorption of B Rh negative cells. An additional 200 cc. of saline washings of the blood clot yielded a useful titer of 1:512. This serum has been dried in convenient small quantities by the adtevac process in glass ampules and vacuum sealed.

The antiserums from each of these volunteers was tested for specificity by typing a consecutive series of mothers and babies in the obstetric service. The serum from case 1 was run parallel with original plasma taken from case 2 following delivery, but before injection of Rh positive erythrocytes. From case 2 after injection of the positive cells the serum was also tested on 271 mothers and babies but not run parallel with the other serum and plasma. These results are shown in the accompanying table.

Results of Testing Antiserums for Specificity

	Total Blood Tested	Rh Negative	Rh Positive	Per Cent Reactivity
Case 1 serum	610	83	527	86.39
Case 2 plasma	610	96	514	84.26
Case 2 serum after injection of red blood cells	271	38	233	85.97

COMMENT

Because of the possible serious consequences of Rh isoimmunization, it is important to decide what criteria should be used in choosing volunteers for production of Rh typing serums by injection of Rh positive cells. First we believe that only those who have been previously isoimmunized (through pregnancy or prior transfusions) should be used. A woman once sensitized to the Rh antigen may find it impossible to have a normal child by an Rh positive husband even though sensitized long before, for example, by transfusions in early childhood. Of course either sex, if previously isoimmunized, faces severe, even fatal, reactions if given transfusions of Rh positive blood. The aforementioned risks which would be deliberately incurred by injecting Rh negative volunteers not previously sensitized probably are not justified even though it appears that a relatively small proportion of Rh negative people are capable of isoimmunization. On the other hand, little if any additional danger is added by increasing the antibody titer. These sensitized individuals in any event should be warned against ever receiving Rh positive blood by transfusion, and mothers who have had an erythroblastotic child or had antibodies in their serum have little chance of having additional normal Rh positive children. Later children, if Rh negative (by another husband or heterozygous husband), would not be affected regardless of anti-Rh titer. Of course, if routine Rh typing should be done universally, the risk of transfusion accidents would be largely eliminated.

In the light of these considerations, we believe that previously sensitized men and women volunteers who understand the essential consequences of the procedure both adverse and beneficial should be accepted for preparation of Rh antiserums as herein described. In the case of women it might be well to accept only those who already have children and especially those not desiring more.

If some risk is still incurred it may well be justified in view of the possible life saving service rendered. For example, the 325 cc. of serum from case 2 alone, because of its high titer, is capable of performing over one-fourth million tests if used at a conservative dilution of 1:40 and assuming 20 tests per cubic centimeter of serum. The problem of producing sufficient anti-Rh testing fluid for routine testing thus appears largely solved. In fact, steps have already been taken by the blood center to make routine Rh testing possible in the obstetric and transfusion services in all the main hospitals of Texas. Furthermore, the use of a strongly reacting testing fluid makes this admittedly delicate test easier to read correctly.

The results obtained by injection of such small amounts of Rh positive blood indicates that the Rh factor may behave as a reasonably strong antigen under suitable conditions. In both cases relatively small total doses of blood were used (7 cc. and 10 cc.) because of uncertainty about the effect on the patient. In view of the reaction in case 1 to 5 cc. we believe larger doses should be used with extreme caution, although the reaction may have been due to pyrogenic substances rather than to hemolysis. In choosing the red cells to inject it seems that the cells of the baby would be most certain to produce further antibodies. On the other hand it may be more difficult to obtain the babies' cells, and in addition these cells may be greatly diluted with transfused Rh negative blood if the infant has been treated for erythroblastosis. Under these circumstances the dosage would be difficult to determine. An alternative would be to use the father's cells if otherwise compatible or to use Rh positive erythrocytes which have been demonstrated to react most strongly with the antibodies already present in the serum of the mother (i. e. cells of same specificity, for example Rh_o'' cells for Rh_o'' antibodies).

In testing the titers of the Rh antiserums the same cells should be employed that were used as the antigen. For the determination of the end point of titration precise measurement of the dilution should be made, using accurate pipets or burets and starting the initial dilution at a fairly high value.

In addition to the value of a high titer in making more tests and clearer tests possible, it should be noted that such serums withstand the necessary manipulations of adsorption with red cells or neutralization with type specific substances without serious reduction of potency. This is important in producing a serum free of interfering anti-A, anti-B or other agglutinins. High titer Rh antiserums also present interesting possibilities for production of subtype antibodies by adsorption

of unwanted fractions by known suitable Rh positive erythrocytes. Furthermore, the choice of different Rh antigens (subtypes) for isoimmunization made possible by our procedure opens up new opportunities for producing specific subtype antiserums.

Because of the value of anti-Rh serum and since there is some evidence that a preservative such as merthiolate may interfere with its reactivity, potent Rh antiserums should be dried from the frozen state in small quantities so that the typing material need not be held in the fluid stage for any length of time.

PREVENTION OF UNINTENTIONAL ISOIMMUNIZATION OF THE RH NEGATIVE FEMALE POPULATION

PHILIP LEVINE, M.D., LINDEN, N. J.

The obstetric history of mothers of erythroblastotic infants reveals that this condition, as a rule, does not occur in the first born. Frequently the first one, two or more Rh + infants are normal. From the point of view of isoimmunization, it is clear that one or more pregnancies with Rh + offspring are required to induce a state of isoimmunization sufficiently intense to produce the hemolytic condition in the following Rh + infant.[1] In other words, the first one or more pregnancies serve the same preparatory function as repeated uneventful transfusions of an Rh — male patient with Rh + blood.

The study to be presented indicates the importance of prevention of the deliberate isoimmunization of the Rh — female population, including even the newborn infant, by transfusions with Rh + blood.[2] Evidence is produced to indicate that even the first born is frequently lost as a result of previous immunization by transfusions. The indications are that once an Rh — individual is immunized, that person remains immunized for the remainder of his or her natural lifetime.[3] Although the immediate evidence of isoimmunization, the presence of Rh antibodies, is evanescent, the tissues responsible for the producton of antibodies, i. e. the cells of the reticuloendothelial system, are capable of responding far more rapidly to the same immunizing stimulus even many years after the initial response. In other words, immune antibodies are demonstrable only for comparatively short periods in contrast to the immunized state, which is persistent for a period of many years and to all intents and purposes must be considered permanent.

Several examples of the long duration of the immunized state produced by several transfusions or by pregnancy or a combination of the two factors have been reported previously.[4] These cases were studied because of the unexpected occurrence of severe transfusion reactions. Recently I studied the blood of an Rh — woman aged 20 whose first pregnancy resulted in the most severe form of erythroblastosis fetalis, i. e. fetal hydrops. Because this severe condition in the first born is remarkably rare, it was suspected that the patient was immunized previously by transfusion. This could be verified because the patient at the age of 6 was transfused several times with her father's blood.

Accordingly, the vast material that I have studied in the past few years was analyzed for the frequency of erythroblastosis fetalis in the first born in two groups of cases: (1) women giving a history of transfusions preceding their first full term pregnancies with Rh + fetuses and (2) a control group not immunized previously by transfusions. These findings, limited to Rh — women, are presented in the accompanying table.

From the Ortho Research Foundation.

1. Levine, P.; Burnham, L.; Katzin, E. M., and Vogel, P.: Am. J. Obst. & Gynec. **42**: 925, 1941.
2. Levine, P.: Human Fertil. **9**: 65, 1944.
3. Levine, P.: Mechanism of Isoimmunization by Rh Factor of Red Blood Cells: Standardization of Anti-Rh Serums, Arch. Path. **37**: 83 (Feb.) 1944.
4. Levine, P., and others, in Mudd, S., and Thalheimer, W.: Blood Substitutes and Blood Transfusion, Springfield, Ill., Charles C Thomas, 1942, p. 309. Weiss, Charles: California & West. Med. **60**: 59, 1944. Levine.[3]

These findings indicate that erythroblastosis fetalis is almost twice as common in the group of Rh — women previously immunized by transfusions. Still more striking, however, is the high incidence of fetal death in the first born in the transfused group. Obviously the transfusions induced an immunized state of the antibody producing cells, so that many years later with the very first pregnancy there already was sufficient intrauterine blood destruction to produce fatal forms of erythroblastosis fetalis.

These findings support the recommendation that no transfusion be given to young women, girls or even female infants unless tests for Rh are carried out. All those found to be Rh — must receive Rh — blood. One or more transfusions of Rh + blood administered to an Rh — female infant may prevent her, many years later, from having one or more normal Rh + infants. On a theoretical basis, this possibility has already been mentioned.[5]

The question arises as to the mechanism responsible for erythroblastosis fetalis in the first born in the absence of previous transfusions. Presumably, this group of Rh negative mothers is selected because of their ready susceptibility to respond to antibody production. The possibility exists, however, that the immunization in these women may have been initiated many years previously by the common practice of administering blood intramuscularly, particularly to the newborn. Since the introduction of the use of vitamin K this procedure, by and large, has been abandoned. The objection may be raised that small quantities of blood will not immunize. There is, however, a good deal of evidence in immunologic literature to indicate that unbelievably minute amounts of blood or other antigens suffice to induce immunization. It has been calculated[3] that the passage of only 0.13 cc. of fetal blood is required to immunize the Rh — mother. Pregnancy and intramuscular injection of blood provide conditions favorable for immunization, i. e. minute quantities of blood acting over a long period.

Erythroblastosis Fetalis in the First Born of Rh Negative Women

Severity of Disease	Transfusion History +	Transfusion History —
Mild	1	4
Severe	5	4
Fetal death	10	1
Number of cases	16	9

In a sense, the conditions for isoimmunization are satisfied in every blood transfusion. It is known that transfused compatible blood survives for a period of one hundred to one hundred and fifty days. Because blood, at any particular time, consists of a red cell population of varying age, there is always a certain small amount of the older red blood cells ready for destruction and, hence, for immunization.

As a rule it is difficult to obtain a history of intramuscular injection of blood, but in view of its routine and indiscriminate practice in the past this procedure must be seriously considered as the source of isoimmunization in Rh — individuals, even in their infancy or their neonatal period. In short, it is necessary to avoid this form of therapy in Rh — girls or women unless Rh — blood is used.

Incidentally, the so-called biologic test to detect Rh incompatibility, as recommended recently, will also serve to immunize.[6]

The unintentional immunization of the Rh — female population by transfusion or intramuscular injection of Rh + blood can now be prevented. This simple measure by itself should reduce the incidence of erythroblastosis fetalis, especially in its more severe forms.

5. Katzin, E. M.: Mississippi Valley M. J. **64**: 171, 1942. Mollison, P. L.: Post-Grad. M. J. **20**: 17, 1944.
6. Wiener, A. S.; Wexler, I. B., and Gamrin, E.: Hemolytic Disease of Fetus and Newborn Infant with Special Reference to Transfusion Therapy and Use of Biologic Test for Detecting Rh Sensitivity, Am. J. Dis. Child. **68**: 317 (Nov.) 1944.

Council on Physical Medicine

The Council on Physical Medicine has authorized publication of the following article. HOWARD A. CARTER, *Secretary.*

BODY MECHANICS AND POSTURE

K. G. HANSSON, M.D.
NEW YORK

Physical medicine is a more correct term than physical therapy when such a subject as body mechanics is included. By body mechanics is meant both the static and the functional relationship between the parts that make up the body, and the body as a whole. The study of body mechanics is of as much value in prevention as in the cure of pathologic conditions of the body. The White House Conference on Child Health and Protection made the guarded statement that "it is reasonable to believe that 75 per cent of the youth of the United States exhibits grades of body mechanics which are imperfect." In zoology and botany one finds more definite information of the relationship of appearance and function. Every one can recognize a sick dog because of the dejected position of his body, and all understand when a plant is failing because of its appearance. Every one in the great army who combats human ailments must be interested in the prevention as well as in the cure of disease. Therefore every one should have some knowledge of body mechanics, because it has its application in all specialties.

Body mechanics may be discussed under the following headings:

I. The relationship of posture to health.
II. Evolution of Posture. (The development of our present body, the anthropology of the various systems and the phylogenesis of their functions, which must be analyzed by body mechanics in its broad sense.)
III. Posture standards and treatment.
IV. Body mechanics in various specialties (orthopedics, pediatrics, obstetrics and gynecology, internal medicine).

I. RELATIONSHIP OF POSTURE TO HEALTH

Our body build is largely inherited, just as the shapes of our features. Our features cannot be changed, and neither can our body build. However, the interrelations of the 200 bones or more which are joined together by ligaments and acted on by muscles are subject to the same mechanical laws and forces which control any other machine. The maintenance of body function, of health, of life itself is concerned with balance between antagonistic forces. Balance is the motivating force in good posture, if we lie down, walk, play baseball, ski or swim. When this balance is disturbed by fatigue, accidents, disease or occupation, the efficiency of the body as a machine is lowered. It may be said that physical laws applied to our body mechanics give the answer to the question if posture is related to physical health.

Even mental health is affected by posture. Our sense of well-being and our emotions are often mirrored in our posture. The psychologist William James once wrote that correct posture kept up the spirits and tended to banish fear and depressing thoughts. All artists, be their medium clay or oil, have always associated alertness with good posture and depression with a slouch.

There are many clinical evidences for the effect of poor body mechanics and health. It is true that we all know of persons with poor body mechanics enjoying apparently perfect health. It must be remembered that our body is wonderfully adjusted to compensate for partial deficiency and also that many persons are satisfied with second or third degree health. The medical profession was slow in accepting poor posture and poor health as one of cause and effect. In 1740 Nicholas Audry taught that many illnesses in children had their origin in imperfect body mechanics. A generation ago the foundation for our present conception of body mechanics and health was brought out by Goldthwait and continued by Osgood. All surveys of posture in our primary schools show less illness, as proved by absences among children taught good body mechanics. Similar surveys in our colleges indicate a definite correlation between good functional health and good body mechanics.

Internists report improvements in arthritic patients when their body mechanics is corrected.

Miller and Polak have shown a definite relationship between posture and health in patients with dysmenorrhea and backache.

Orthopedic surgeons have overwhelming evidence for the importance of body mechanics both as a preventive and as a curative agent. Foot strain, knee pain, backache and many other complaints come daily under their observation and may be eliminated or improved by correction of body mechanics.

II. EVOLUTION OF POSTURE

Comparative anatomy teaches much about the assumption of the erect posture, and to understand body mechanics, one has to consider the alterations that the human anatomy underwent when the body was changed from quadruped to biped. This alteration in posture caused very definite changes not only in the shape and actions of bones and muscles but also in the workings of the circulatory, digestive, endocrine and nervous systems. Further analysis disclosed changes in the histologic structure of the tissues and in the chemistry of the body.

(*a*) *The Skeleton.*—When strolling through a museum of natural history and viewing the skeletons of reptiles, birds, dogs, anthropoid apes and man one can easily visualize what kind of locomotion such a skeleton performed. The reptile's skeleton was made for swimming and crawling. The forelimbs were developed to raise the animal off the ground and into the air. The hind legs were developed together with the foreleg, and there was the quadruped. The anthropoid apes began climbing trees and holding the body erect at intervals, at least, and man represents the highest development in biped skeletons. The spine changes little, but the head and extremities show pronounced changes. The skull becomes bigger and heavier, especially the frontal and parietal bones. This heavier head is balanced on the cervical spine with the convexity forward. The scapulas are displaced downward, giving a longer neck with more mobility, which compensates for the fact that the eyes are directed forward. The keynote of construction in the shoulder and upper extremity is mobility and speed rather than support. The human clavicle is long in order to hold the shoulder girdle away from the sternum. Thereby the clavicle becomes parallel to the posterior ribs rather than to the lateral ribs as in the quadruped. The glenoid fossa is

small, allowing free movement of the humerus, and this movement is restricted and protected by the acromial process. The so-called carrying angle at the elbow, the slightly separated bones in the wrist and the separation of the thumb from the other fingers are characteristic of the human skeleton.

The biped thorax has its greatest diameter from side to side, with a wide costal angle. The first rib is almost horizontal, and the last rib is nearly vertical and may produce periosteal irritation with the transverse process of the vertebrae.

The spinal column, originally intended for swimming and crawling, presented a convexity posteriorly. The baby is born with a one curve spine, but when it can raise its head the cervical curve develops, and when it can stand the lumbar curve is formed. The sacral and coccygeal vertebrae help to reinforce the pelvis. The spine, with its strong vertebral bodies, its numerous processes and the intervertebral cushion-like disks, is a marvel of elasticity and strength. There are many variations of the spine, both as to number of vertebrae and as to degrees of the curves. They may be regarded as evolutionary progression or retrogression. Thus a lumbar spine of four vertebrae may be considered as a progression and the one curve spine in spondylitis as a retrogression. The force of gravity, transmitted through the spine, is received by the sacrum at an angle. The anterior surface of the sacrum is broader than the posterior surface, and therefore a certain amount of anterior-posterior motion is possible. However, any displacement between sacrum and iliac bone is questionable. The lumbosacral articulation is more commonly involved in pathologic conditions of the lower part of the back. Here a freely movable spine meets a rather rigid pelvic girdle. In the quadruped the sacrum and the ilium are long, narrow bones, while in the biped there are broad, flaring sacrum and iliac bones. These, together with ischial and pubic bones, support the viscera above, protect the reproductive organs within and serve as muscular attachment for the powerful walking muscles. A plane laid through the symphysis pubis and posterior superior iliac spine is at about 40 degrees with the vertical frontal plane and at about 50 degrees with the horizontal plane. The analyses of these planes are important when dealing with body mechanics, because the pelvis works as a double lever with the fulcrum in the hip joint, and any changes in these planes have an important bearing on the position of the spine.

The angle of the neck of the femur is depressed from 150 degrees in the quadruped to 125 degrees in adult man. The head and neck are rotated forward, so that on standing most of the head looks forward. The femur is bowed forward in man, and it was from the study of the histologic construction of the femur that Wolff evolved his law of functional adaptation. Most quadruped knees are held in flexion, while the human weight bearing knee supports the body weight in extension. The medial condyle of the femur is more distal than the lateral one, which projects forward slightly. This projection prevents the slipping of the patella when the quadriceps contracts. The line of gravity falls slightly to the outside of the middle of the knee joint as the result of the valgity. This is even more pronounced in knock-knees, while in bow legs gravity falls toward the median side. Knock-knees are more prone to give trouble than bow legs and often show ligamentous strains and patellar deviations.

It might be suspected that the change to the erect posture would be pronounced in the foot, which is the point of contact between the skeleton put on end and the ground. This is the case. The tarsal and metatarsal bones are in closer apposition than are the corresponding quadruped bones. The development of the horizontal and transverse arches are seen. The big toe is held in extension and close to the other toes, which are held in flexion. The inverted foot of the tree-climbing ape is now everted, and the heel, the outer edge of the sole, the distal ends of the metatarsals and the entire hallux are developed for weight bearing purposes.

(*b*) *The Muscular System.*—The changes in the skeleton are mainly determined by muscles. The aforementioned skeletal changes are therefore to be considered in the light of trophic stimuli of function.

The quadruped holds up his head by means of a powerful ligamentum nuchae, which is aided by strong posterior neck muscles. In the human being the skull is delicately balanced on the cervical spine, the ligamentum nuchae is rudimentary and the neck muscles act like guy ropes. It is easy to understnad that if the human construction of head balancing is forced to hold the head in the quadruped way an undue strain is put on the posterior neck muscles. This is what takes place when one sits in a slouching position with the chin touching the chest, and it will result in a myositis that is often encountered and not easily dealt with unless the position of the head is corrected.

The trapezius, the levator scapulae and the rhomboids help to hold the scapulas in place. When the shoulders are allowed to slide forward and down, pressure symptoms may develop from the cervicobrachial nerves and the blood vessels.

The development of the deltoid in man is related to the increased motion in the glenoid fossa. This has been obtained at the expense of power and stability. One recognizes this in the whole upper extremity. A phylogenic study of the upper extremities shows that abduction, external and internal rotation in the shoulder joint, supination and pronation in the forearm, and apposition of the thumb to the other fingers are more recent developments. It is also of interest to speculate on the fact that these phylogenically younger movements are the first ones lost and last ones regained in many pathologic conditions. These are probably examples of specific morbidity.

An analysis of the mechanics of the extensors and flexors of the wrist and fingers, and the supinators and pronators of the forearm, will give a better understanding of traumatic external epicondylitis and will produce better results in its prevention and treatment.

The most pronounced change in the hip, when the anthropoid is compared with man, is the development of the abductors and the extensors. The opposing adductors and flexors were stretched when the biped position was assumed. Certain check ligaments reinforce the hip joint, the strongest one being the Y ligament, which becomes taut in the erect position. The specific morbidity based on phylogenesis should produce a flexion-adduction deformity in the hip joint following injury and disease, and this is exactly what takes place, and the comparatively new motions of extension and abduction are lost.

The biped locomotion, with flexion-extension of hip and knee, requires a more specialized quadriceps muscle than is seen in the quadruped. This muscle is the keystone of good walking. The coordinated flexion in the

hip and extension of the knee are made possible by the union of the rectus femoris and the vastus medialis and lateralis into one tendon, which is kept taut by the vastus intermedius. Any atrophy or diminished tone of this important muscle, which frequently follows pathologic conditions of the femur, or the knee, should be counteracted as early as possible, or the convalescence will be a very long one.

The knee extension is checked by the hamstring muscles, gastrocnemii and the popliteal ligaments, which latter reinforce the capsule. Any motions but flexion and extension are prevented by the lateral ligaments, the external and internal menisci and the crucial ligaments. The continued sitting position often leads to shortened hamstrings and gastrocnemii. In biped walking the body weight must be lifted and the foot must push the body off the ground. For this purpose the plantar flexors of the toes and foot are well developed. The thirty-eight articulations of the foot, supported by numerous ligaments, the anterior-posterior and lateral arches, all activated by long, slender, quick action muscles and coordinated with movements in knee and hip, make the human gait a great advancement over the shuffling locomotion of the anthropoid ape. The everted human foot, held parallel to the ground by the peroneal muscles, is far different from the grasping inverted foot of the ape, which type of foot is, however, found in the newborn baby up to the age of walking. The extension and eversion of the foot are undoubtedly phylogenically younger movements, and these functions are usually the ones easily lost in paralysis and neuritis from alcohol or metallic poison.

(*c*) *The Gastrointestinal Tract.*—The spine being the main support of the viscera, it is evident that the change to an erect position will affect the organs concerned with the maintenance of nutrition. If several rings are held on a horizontal stick they will hang free from one another, but if the stick is brought to a vertical position the rings will crowd on one another at the lowest point. This is what takes place, to some extent, in the change from a quarduped to a biped posture.

The stomach is attached to the diaphragm at the cardia, and the pyloric end is fixed to the body wall. The liver is partly suspended from the diaphragm and the transverse colon indirectly by means of the mesocolon. A great load is therefore carried by the center of the diaphragm, which, at least partially, is held through the right pericardium by the continuation of the cervical fascia. This fascia is attached to the cervical spine and mastoid process. One can understand, therefore, how flexion of the head and neck relaxes the cervical fascia, causing a ptosis of the viscera in the upper abdomen with pressure exerted on the organs in the lower abdomen and pelvis. Thus it is of importance to carry the chin in and the head back.

The stomach is usually placed well under the ribs of the left thorax. The upper part of the abdomen is roomy, but the lower part is very narrow because of the dorsal and lumbar curves of the spine, which give the maximum room above and the necessary support below. In fact, the anterior surface of the fifth lumbar vertebra is nearer to the anterior surface of the body than it is to the posterior surface.

The spaces flanking the vertebral bodies are filled with the psoas and quadratus lumborum muscles, which adds to the formation of a pear shaped abdominal cavity. The axis of this cavity to the perpendicular line is about 30 degrees. The pelvic cavity, which is directed down and back, has an axis which shows an inclination of about 60 degrees with the perpendicular line. Thus the two cavities are at right angles to each other, which, of course, counteracts the pressure downward. It is in this pear shaped abdominal cavity that the viscera are suspended.

The liver, spleen and kidneys rest on shelves reinforced by adipose tissue and suspended by fibrous bands. The small and large intestine are, in the main, suspended; the other viscera are shelved. In quadrupeds the whole large intestine has a mesocolon. The human ascending and descending colon is usually retroperitoneal and only the transverse colon has a mesocolon, which is suspended from the stomach. However, the quadruped mesocolon persists in about 30 per cent of human intestines, and this adds to the crowding of the viscera. It is evident that any deficiency in the suspension or in the shelves will produce a ptosis and will increase the kinks in the stomach as well as in the small and large intestine; these will have an unfavorable influence, in turn, on the digestion, assimilation and evacuation of the gastrointestinal tract. The congestion that results in the lower abdomen and in the pelvis may add to the factors producing leukorrhea in the female and prostatitis in the male, as well as prolapse of the uterus and anus.

(*d*) *The Circulation.*—The experiment in which a rabbit, when held erect, died from hemorrhage into the splanchnic area suggested that the circulatory system must have undergone certain changes when the biped posture was assumed. In the quadruped body the heart forces the blood stream in horizontal arteries and downward into the extremities, and the only veins that must sustain the weight and pressure of a vertical column of blood are those of the extremities and the intercostal veins. Therefore these veins are provided with valves.

In the erect posture the circulation becomes vertical. One can easily comprehend the increased work that the biped position threw on the cardiac musculature when it is considered that much of our rest is taken in the sitting position, which does not materially alter the load of the vertical circulation on the heart. The valves remain in the intercostal veins, although they have become unnecessary. The lack of such valves in the portal vein may be one of the contributing factors in hemorrhoids, pelvic congestion and ascites.

In the erect position the top of the head is about 40 cm. above the level of the heart, whereas in the quadruped the highest point is only about 15 cm. above the heart. The 25 cm. difference in the blood column represents about one twenty-fifth of an atmosphere. This is a definite addition to the quadruped blood pressure in the left ventricle, and the human organism is as yet but imperfectly adapted to it.

In addition, the arterial pressure is increased by gravity in proportion to the depth below the level of the heart, a depth which varies in both biped and quadruped positions. The portal circulation in the quadruped is at practically the same level as the heart. However, when the biped posture is assumed, the veins of the portal circulation lie 15 to 25 cm. below the heart level and the pressure in these blood vessels is suddenly raised from 15 to 25 mm. of mercury. On account of the high capillary pressure in man there is a greater tendency to edema of the dependent parts than in similarly constituted quadrupeds. This tendency applies especially to the portal area, where the integument is loose, there is double circulation and there is less capillary support.

(*e*) *The Nervous System.*—Although we have seen how the stimulation of muscular contraction affects the bone production, the question of how the osteoblasts rearrange their alinement and production can be answered only by scientific speculation, because of our limited knowledge of biochemical and electrothermic processes. However, it can be assumed that the nervous system plays some part in this trophic change because of the absence of functional response in cases of paralysis. It is therefore necessary to consider the changes into higher specialization of the nervous tissue which made the erect posture possible.

Judging by a child's first efforts to stand and walk, it seems that the erect posture was initially a very conscious effort and that it became less so by force of habit. To keep the skeleton on end in addition to all the other fields of activity thrust on the nervous system in the biped posture required an enormous increase in the size and specialization of this system.

For our purpose, the nervous system may be studied in relation to balance and muscle tonus. Balance is maintained by vision, the semicircular canals, the cerebrum, the cerebellum, and the deep-muscle sense, and deficiency in any one of these will stimulate the remaining ones to increased activity. This accounts for the superior muscle sense of the blind and is the basis of Frankel's treatment of locomotor ataxia.

By muscle tonus is meant the slight persistent tension which is characteristic of a healthy muscle. This tonicity is of the greatest importance in the maintenance of good body mechanics. Our knowledge of muscle tonus is rather limited, but it can be safely stated that the brain and the spinal cord, as well as the impulses arising in the muscles themselves, take part in the control, production and maintenance of the muscle tonus.

The brain's share in maintaining the erect posture may be deduced from the fact that mental concentration is more likely to produce correct posture than the lethargic state of the mentally deficient, among whom the quadruped posture is approached.

Experimental physiology demonstrates that a spinal frog, when suspended, will not take the attitude that gravity would impress on it. If one hind limb is extended gently it will soon draw up and resume the familiar crouching position. This posture of the limb is therefore the result of impressions continually ascending its proprioceptive nerves and exciting a tonic activity, which predominates in certain definite muscles. These posture reflexes, as carried out by the spinal cord, are segmental responses. They determine the relation of the limb to the trunk and, to a lesser degree, of the four limbs to one another. Experiments by Sherrington show that they are reflex in nature and are confined to the so-called antigravity muscles, which maintain the erect posture.

There is no doubt that some primitive posture reflexes are retained in man. We may even assume two posture centers, one in the upper cervical region and the other in the lumbar region. If the patient sits in a relaxed position, throwing the head back in extreme extension of the cervical spine, and from this attitude flexes the head forward so that the chin is pulled in, the result will be that the upper part of the body will assume the correct posture; that is, the back will straighten out, the thorax will be elevated and the scapulas will slide back and down where they belong. It is also of interest to note the postural reflex in the lumbosacral region. If a patient, lying face down, is asked to extend one of the lower extremities with the knee straight, a slight internal rotation of the extremity as a whole will result, with the foot in inversion. These two postural reflexes are of importance in the treatment of faulty body mechanics.

There is another side to posture reflexes, which has been studied by Magnus and de Klein. This deals with plants as well as with animals and their growth in relation to the environment. These investigators have shown that plants orient themselves in regard to gravity along well defined laws. This orientation is called "geotropism" and these same geotropic reflexes, or righting reflexes, are responsible for the ability that animals have to restore themselves in erectness. The phenomenon of a cat always alighting on its feet when tossed in the air is a well known example of this righting reflex.

Thus, in the final analysis of posture one arrives at the postural tone, which Sherrington has defined as "the reactions in which the configuration of the body and its parts is preserved, in spite of forces tending to disturb them, by the activity of contractile tissues, these tissues then functioning statically." This is the basis of physical education, the fundamental truth of which has been forgotten in the search for new and sensational systems.

(*f*) *The Endocrine System.*—Closely associated with the nervous control of body mechanics are the endocrine organs. Study of pathologic conditions of the pituitary gland leads to the deduction that there is some control by this gland over the growth of bones. The pituitary disease called acromegaly, in which the response of the osseous tissue to external stimuli is much increased, forms a beautiful example of Wolff's law. The voluntarily most active parts of the body are the lower jaw, the hands and the feet, and these parts are much overdeveloped in patients suffering from acromegaly.

From similar observations it is known that the overactivity of the thyroid gland produces a slender body type and that diminished activity of the thyroid produces the stocky type of myxedema. The same considerations apply to the thymus, ovaries and testis, all of which, to a certain extent, determine growth and nutrition.

III. POSTURE STANDARDS AND TREATMENT

The human body cannot be standardized, and individuals therefore cannot be made to conform to any definite preconceived standard physically, mentally or spiritually. Two contrasting body types must be recognized. There is the slender, high strung body build, often referred to as the carnivorous type. The other extreme is the stocky, placid type, also known as the herbivorous type. In between are all grades of variation. The posture standards illustrated here can be obtained from the Children's Bureau, Department of Labor, Washington, D. C. Although photographs and x-rays are valuable, they are not always practical. The physical examination should note the following:

1. Drop a tape measure from the mastoid process over the acromial process; it should hang over the greater trochanter and external malleolus. Also drop a tape measure from the posterior process of the seventh cervical vertebra; it should hang midway between the buttocks, the knees and the malleolii.

2. With the patient placed with his back to the wall and the feet 1 inch away, there should be only slight curves in the cervical, dorsal and lumbar regions. The chin should be pulled in over the sternal notch. The sternum should be the farthest forward part of the body, with the costal angle wide. The lower abdomen should be flat. The lower extremities should be

properly alined with the pelvis and the trunk. The femur and tibia should be perfectly opposed in the knee and this maintained by proper muscle balance, favorable to the weight bearing lines which protect the joint mechanism of the feet.

3. The body in motion must also be examined. Let the patient walk about the room and also jump on the right and left foot alternately. This will give an idea of the patient's motor habits.

TREATMENT

The causes of poor body mechanics may be considered under overactivity, insufficient or improper food, weakness against gravity and inherited or acquired faulty positions or movements.

Overactivity.—The rational treatment of overwork is, of course, rest. Hugh Owen Thomas said, many years ago, "The urging need of our art is the fact that much of our surgery is too mechanical, our medical practice too chemical, and there is a hankering to interfere, which thwarts the inherent tendency to recovery possessed by all persons not actually dying." Complete rest position should be approached as much as practically possible. This can be accomplished only on a hard mattress, with no pillow or a very small one. A small pillow under the knees will relax the iliopsoas and produce the anatomic rest position in the lower back, hips and knees. This position will rest the balancing mechanism, which means that the nervous and muscular systems cease working at high speed and have a chance to recuperate. The circulation becomes horizontal, with less demand on the heart and blood pressure. Gastrointestinal distress is often relieved by the recumbent position, respiration is easier and slower, and there is less strain on ligaments and cartilages.

Diet.—The quantity and quality of the food intake correspond to the fuel fed to a machine. We cannot expect function of the body unless properly supplied with carbohydrates for energy, protein for repair, and fat for insulation, minerals, vitamins and so on. The mechanical efficiency of the human body corresponds very well with a machine. In untrained men it is about 20 per cent, in trained men 25 per cent, and in outstanding athletes 33 to 41 per cent.

Support.—Constitutional weakness due to many causes, such as exhausting disease, operation, occupation and environment, often needs support. This support is often necessary in the interim between rest therapy and following the period of exercises. The shoulders may have to be held in a corrected position or the arches raised by means of adequate and inoffensive mechanical apparatus. However, it must be remembered that any kind of support is only a temporary remedy, except in the very aged, and should be discarded as soon as the muscles have regained their tone.

Postural Exercises.—Therapeutics in any field of medicine must be directed against the cause in order to be successful. If this is remembered when one is dealing with faulty body mechanics, it must be realized that exercises are not always the answer to poor posture. However, when exercises are indicated, they must be picked with discrimination. It must be realized that every effort to change voluntarily the relative position of the parts of the body is made through the use of the motor habits, which are expressed in the body alinement. To change posture, motor habits must first be changed in the motor pathways in the nervous system. With this change a different muscular response, both for balance and for movement, will occur. This is best accomplished by slow and oft repeated movements and the visualization of stabilized relationships of the various parts of the body during movement. The principle of posture exercises is best expressed by Cochrane: "If proper posture be maintained by conscious effort for a short time, then the increase of reflex tonus obtained by such posture will serve to maintain the proper attitude without the patient's requiring to give the matter thought and attention." The earlier such posture teaching occurs, the better, since age intensifies muscular habits.

BODY MECHANICS AT DIFFERENT AGES

Preschool Age.—This includes infancy to beginning school age. The baby's parents should be instructed in the symmetrical and nondeforming positions of recumbency as well as in the proper positions of holding the baby. Careful examinations of the baby's head following moving objects, of the grasping reflex of the hands, the kicking reflex of the lower extremities, the efforts at sitting, creeping and standing, will disclose possible abnormalities in growth and function. Some educators maintain that we waste five years of our lives being housebroken when much instruction could be given the child. Be that as it may, it seems only rational to watch this age group for tendencies to faulty body mechanics present in the parents and institute preventive measures. The type of exercises recommended are based on the primitive posture reflexes as advanced by Dr. Haynes. These postural reflexes were developed in the central nervous system before the frontal lobe of the cerebrum learned to think for man. They are the accumulation of associated movements.

Body Mechanics in Children of 5 to 12.—This is the age in which posture consciousness should be taught. However, it should not be associated with punishment. Instead, one should make use of plays and games so that the child will think of good posture with pleasure rather than with penal apathy. With girls, good body mechanics should be discussed in relation to dancing or the proper wearing of clothes. With boys, it is best taught in relation to sports. It is easy to bring out good body mechanics and to correct postural defects when describing the proper use of the body in baseball, swimming, skating and other activities. By combining postural correction with activities, the abnormal stiffness that our forefathers associated with correct posture is avoided and the easy, relaxed carriage is produced. Whenever possible, the natural posture reflexes should be the basis for the postural exercises in this age group. Corrective positions during rest periods are also recommended.

Body Mechanics in Adolescence (second decade).—In this age group body mechanics should be taught in relation to health. The school physician, the school nurse and the biology teacher should be included with the gymnasium teacher in the posture program. Efficiency in athletics should be emphasized in its relation to good body mechanics. A certain amount of corrective training should be introduced, based on hygiene, prevention of future defects and efficiency. There is no reason why such postural habits should not be part of the adolescent life the same as the care of the teeth and the skin, which has been generally accepted.

Body Mechanics in Adult Life.—In this age group we encountered forces of occupation that may alter our body mechanics. It is wise to analyze possible damage done to our body by inactivity at a desk, by monotonous movements repeated throughout the day, and by faulty

positions maintained in relation to machines or other unnatural static or dynamic functions that are imposed on civilized man. It is most important to counteract possible postural, occupational defects by exercises or games which will bring into use such parts of the body as are inactive or stretched during occupation.

IV. BODY MECHANICS IN VARIOUS SPECIALTIES

(*a*) BODY MECHANICS IN ORTHOPEDICS

No specialty comes in closer contact with body mechanics than orthopedics. I will mention only a few:

In congenital torticollis that has persisted for several years the child gets into the habit of photographing his surroundings on a certain field of the retina. The consciousness of such pictures is related to the child's appreciation of his position to his surroundings. Geotropic reflexes are built up which give the child the impression of being straight when his head is actually crooked, and vice versa. Therefore the cutting of the shortened sternocleidomastoid muscle and the shortened cervical fascia is only the beginning of the treatment. The patient's motor habits, based on the photograph of the surroundings on the retina and its interpretation, must be reeducated. This is a refined point in body mechanics that is most important.

The lateral curvature of the spine of the idiopathic type should be treated as a postural deformity, and symmetrical exercises should be instituted and carried on till the patient reaches at least his sixteenth year. Special attention to the patient's general health, as indicated by his vital capacity, is most important.

The use of postural exercises in low back pain has been confused a great deal. The confusion is due to the fact that the same exercises have been prescribed for all pathologic conditions in the lower part of the back. It should be emphasized that the exercises should be specific and should be based on the pathologic changes present. Dealings with low back patients are facilitated by the following clinical classification:

GROUP 1.—A more or less severe tear may occur, producing a hemorrhage and muscle spasm. The muscles most involved are the quadratus lumborum, gluteus maximus and gluteus medius. A myositis is produced, by laymen called lumbago. The exercises should be preceded by relaxation and the movements should consist of gentle, rhythmic changes of position of the spine, often repeated, but without great effort.

GROUP 2.—There is instability of the lumbosacral region due to congenital defects, an increased lumbosacral angle, spondylolisthesis and other mechanical weaknesses of the fifth lumbar region. Here an attempt should be made to strengthen nature's corset, represented by the abdominal muscles and the gluteal muscles, and correct the posture relation between the pelvis and the spine. A typical exercise is the pelvic roll.

GROUP 3.—Any muscle imbalance in one part of the body will result in compensating imbalance in other parts. A pronated foot, short heel cord, contracted hamstrings or spasm of the tensor fasciae and erector spinae are examples. This requires careful analysis of the body mechanics. The exercises should stretch the shortened muscles, and their antagonists should have concentric movements.

GROUP 4.—This group includes the arthritic spine, by far the most common pathologic condition in the middle and old age group of patients. Included here are synovitis, or arthritis of the small joints of the spine, and also fibrositis along the spine. In the early stages of these conditions it seems rational to try to prevent freezing of the joint motions. This is done by active and passive separation of the articulations. Traction on the spine, flexion forward and sideways, but especially extension, lying, sitting and standing as tall as possible, are the principles used.

GROUP 5.—Here may be gathered such specific cases as fractures and subluxations, synovitis of the sacroiliac joints and rupture of the nucleus pulposus. In this group the treatment is usually specific, but exercises are often used in the convalescent stage and for symptomatic relief. Attention to the general body mechanics should be observed. The proper alinement of the various segments of the body should be checked and possible spasm and muscle shortening counteracted.

(*b*) BODY MECHANICS IN PEDIATRICS

Pediatricians are usually concerned with children's diet, heart and lungs, tonsils and the infectious diseases of childhood. Body mechanics is seldom considered. The more importance laid on prevention, the more the responsibility is laid on the physicians who guide the child through the early life. Modern civilization has imposed many hardships on the human being, and a child's activities suffer more than an adult's activities. The child has less resistance. Let us, therefore, be kind and understanding, instead of nagging and punishing when we analyze defects in our children. The cause of the child's poor posture should be carefully diagnosed. It may be poor eyesight, poor nutrition or fatigue from various causes, such as constitutional disease or overactivity. There might be inherited weakness. It is evident that the treatment should vary. Exercises are not always indicated. However, when exercises are indicated they should be made a pleasure for the child and not an ordeal. The postural examination should be included in the physical examination and the following facts should be realized:

The feet are the foundation for weight bearing in standing and walking, and any defect in them will influence the rest of the body. If the feet are the foundation and the legs the supporting structures for the pelvis, we have the same mechanics as that of a bridge. The load of transportation varies, and stresses and strains must be met. The load that this bridge carries is represented by the trunk, which is held upright by the spine. In order to support the spine firmly, the pelvis should be placed in good mechanical relation to the spine. The spine, shoulders and arms can be likened to a coat rack, of which the main stem is the spine, the transverse hangers are the shoulders and the hanging coats correspond to the arms. If the spine is correct, the shoulders and arms will fall into the proper position. The head should rest with ease on the spine. This mechanical posture of the skeleton is maintained by muscles, which receive their tone from the nervous system, which in turn depends on the glands and the general nutrition and health of the body.

(*c*) BODY MECHANICS IN OBSTETRICS AND GYNECOLOGY

The specialties of obstetrics and gynecology seem far from the interest of body mechanics. However, statistics show that of 1,000 cases coming to a gynecologic clinic with the complaint of backache only 18 per cent were due to gynecologic disease and 82 per cent were postural in origin.

Dr. C. I. Miller of the State University of Iowa College of Medicine has published a study of young women in relation to dysmenorrhea. Among young women with dysmenorrhea he found 21.7 per cent with

good posture and 78.3 per cent with poor posture. In the group without dysmenorrhea, 73.9 per cent had good posture and 26 per cent had poor body mechanics.

It is only rational to believe that the great strain put on body mechanics in the pregnant woman should merit more careful consideration. The center of gravity is altered during pregnancy, greater strain is put on the weight bearing extremities, physical activities are restricted, muscles are overstretched, the nutrition is unbalanced, and most of the body systems are put to severe tests. Therefore more thought should be given to the reconstruction of the delivered mother. It seems perfectly logical that child bearing should be carried out without permanent deformity to the body by prescribing postural corrections at the earliest date that these can be taken without danger of hemorrhage or fatigue. Special care should be taken to insure return of normal tone to abdominal muscles, and proper weight bearing of pelvis and spine.

(*d*) BODY MECHANICS IN MEDICINE

The internist has been slow in accepting the place of body mechanics in his armamentarium of cures.

However, overwhelming evidence has been presented by Pemberton, Swain and others that the arthritic patient must be taught the proper use of his body as a whole as well as the various joints. Chronically ill patients may be much improved by instruction in body mechanics. Many can be helped by special substitution movements or mass movement exercises.

Visceroptosis has received much attention from the point of view of body mechanics. Rest, support, diet and the proper instruction in posture and proper postural function are generally accepted now as the foundation for the management of these patients.

Much of our training of spastic hemiplegia depends on the application of body mechanics.

Brachial neuritis, the scalenus anticus syndrome or the cervical rib syndrome are often postural in origin and can be relieved by correcting the position of spine, head and scapulas.

CONCLUSION

Body mechanics, or posture, assumes a greater importance and a wider application when viewed in the light of the foreging discussion. Certain conclusions also may be drawn:

1. The relation between health and body mechanics is soundly based on physical laws and on physiology. There is increasingly strong clinical evidence of posture and health being the cause and effect in many conditions.

2. The physician must be trained in the anthropology and phylogenesis of anatomy and function, so that he can analyze mechanical defects and prescribe proper treatment.

3. The question of posture standards is not satisfactorily solved, but a certain amount of literature can be obtained from the Children's Bureau, Department of Labor, Washington, D. C.

4. There is a definite need of more interest and more understanding of body mechanics among pediatricians, school physicians, gynecologists and internists.

Humiliating statistics were revealed by the universal draft in World War I, and it will be interesting to see if our present physical examinations for the draft will show any improvement. It is a pleasure to testify to the fact that our men in the armed forces today show the carriage and alertness of efficiency after even a short training period.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

The following additional articles have been accepted as conforming to the rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the rules on which the Council bases its action will be sent on application.

AUSTIN SMITH, M.D., *Secretary.*

VINBARBITAL SODIUM.—Sodium-5-ethyl-5-(1-methyl-1-butenyl) barbiturate.

Actions and Uses.—The actions and uses of vinbarbital sodium are somewhat similar to those of a barbituric acid derivative, having a short induction period and a moderate duration of action. It is used as a hypnotic and sedative. Like other barbiturates, this compound may cause side effects. These include epigastric discomfort, nausea, dizziness, pallor, apprehension, incoordination, weakness, headache and "hangover," while adequate dosage frequently causes a fall in blood pressure.

Dosage.—As a sedative, 32 mg. repeated three to four times daily; as a sedative and hypnotic, 0.1 Gm. to 0.2 Gm.; as a preoperative hypnotic, 0.1 Gm. to 0.2 Gm.; in psychiatric cases, 0.1 Gm. to 0.4 Gm.; for obstetric sedation and amnesia, 0.2 Gm. to 0.4 Gm., with or without scopolamine. Children must be given correspondingly smaller doses.

Caution.—Unbuffered aqueous solutions of vinbarbital sodium are not stable but decompose on prolonged exposure to the air. The powder is hygroscopic, and if capsules are broken or exposed to high humidity the contents are affected by both moisture and carbon dioxide.

Vinbarbital sodium occurs as a white, odorless powder, possessing a bitter taste; soluble in alcohol and water; slightly soluble in ether and chloroform. A 1 per cent aqueous solution is alkaline to phenolphthalein and has a p_H between 8.5 and 9.5.

Tests and Standards.—

To 3 cc. of a 10 per cent solution of vinbarbital sodium slowly add 2 cc. of dilute hydrochloric acid; allow the precipitate to crystallize, filter, wash and dry at 90 C.: the melting point of the vinbarbital is 161 to 163 C.

Transfer 5 cc. portions of a 10 per cent solution of vinbarbital sodium to two test tubes and to one add 1 cc. of mercury bichloride solution: a white precipitate results, soluble in 10 cc. of ammonium hydroxide; to the other portion add 5 cc. of silver nitrate solution: a white precipitate results, soluble in 5 cc. of ammonium hydroxide.

Dissolve 0.1 Gm. of vinbarbital sodium in 10 cc. of distilled water, add 1 cc. of sodium hydroxide solution and 4 drops of potassium permanganate solution: a green color develops in twenty seconds; add 5 cc. of dilute hydrochloric acid: the solution turns pink and a brown precipitate appears. Boil 0.5 Gm. of vinbarbital sodium with 5 cc. of 25 per cent sodium hydroxide: ammonia is evolved.

Acidify 40 cc. of a 10 per cent solution of vinbarbital sodium with dilute nitric acid and filter; separate portions of 20 cc. each of the filtrate yield no opalescence with 1 cc. of silver nitrate solution (*chloride*): no turbidity with 1 cc. of barium nitrate solution (*sulfate*); no coloration or precipitation on saturation with hydrogen sulfide (*salts of heavy metals*).

Transfer about 3 Gm. of vinbarbital sodium, accurately weighed, to a glass stoppered flask, add 50 cc. of anhydrous ether and shake for ten minutes. Decant the supernatant liquid through a filter and again extract the residue with 15 and 10 cc. portions of ether. Evaporate the combined filtered extracts to dryness in a tared beaker on the steam bath: the residue does not exceed 0.5 per cent.

Transfer about 0.5 Gm. of vinbarbital sodium, accurately weighed, to a separator, add 30 cc. of water and 10 cc. of dilute hydrochloric acid. Extract with seven successive portions of ether, filter the combined ethereal extracts and evaporate in a tared dish in a warm stream of air: the 5-ethyl-5 (1-methyl-1-butenyl) barbituric acid content is not less than 89.5 per cent nor more than 92 per cent. Evaporate the aqueous residue to dryness, add 3 cc. of sulfuric acid and evaporate the excess acid. Repeat, using 1 cc. of acid and incinerate the residue: the sulfate ash is not less than 27.5 nor more than 29.5 per cent.

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SATURDAY, JULY 28, 1945

THE THERAPEUTIC USES OF RADIOACTIVE PHOSPHORUS

Radioactive phosphorus has now been employed experimentally in treatment for about six years. The earlier work on this subject has been previously discussed in these columns.[1] Now a fairly extensive experience with this form of therapy has accumulated, especially for the leukemias and polycythemia vera. Recently Warren[2] reported results in the third large group of patients treated by this means since 1940 with radioactive phosphorus, consisting of 81 cases of leukemia, myeloma, Hodgkin's disease and polycythemia vera. The radioactive phosphorus employed in his series was prepared either by bombardment by the cyclotron of red phosphorus placed in an external target chamber or by the bombardment of an iron phosphide probe placed in the deuteron stream of the cyclotron just inside the port. Most of the cases of leukemia subjected to treatment had failed to respond to or were known to be refractory to prior roentgen therapy. Some of them were far advanced cases. Harm did not result from the administration of radioactive phosphorus in the doses employed. Furthermore, a limited number of cases "have done better" than would be expected with the ordinary means of therapy. However, if extensive leukemic infiltration of the marrow is present and there is little normal hemopoiesis, nothing is gained by treatment which destroys the leukemic cells. Under those circumstances the effect is merely to change the leukemia to an aplastic anemia. The basal metabolic rate, Warren says, is one of the useful guides to progress of the disease. This reflects the activity of the leukemic process and may be an even better index during the course of therapy than is the peripheral white blood cell count. Radioactive phosphorus, Warren concludes, provides a safe means of internal irradiation of leukemic tissue. Most patients respond with clinical and hematologic improvement, but the treatment must be considered palliative rather than curative, as the ultimate prognosis of leukemia remains grave.

Radioactive phosphorus in the treatment of polycythemia vera may now be considered of established value. Not only Warren but Hall and his colleagues[3] and others have obtained good results in the use of radioactive phosphorus for this disease. Hall and his colleagues employed this therapy for 12 cases of polycythemia vera over a period of two and a half years. Satisfactory remissions were induced in 8 of the 12 cases and incomplete remissions occurred in 2. Although the results were unsatisfactory in the remaining 2 cases, these investigators believe that this was due to inadequate dosage. In the group in which satisfactory remissions were obtained, both clinical and hematologic improvement occurred. The symptoms attributable to polycythemia vera disappeared and remissions lasting from eighteen to twenty-six months were observed in the favorable cases; 6 of the remissions had lasted for more than a year. The results obtained, the ease of administration (intravenous), the absence of radiation sickness and toxic symptoms and the concentrated effect of the irradiation on the cells of the bone marrow, together with the fact that radioactivity disappears gradually and dosage can be adequately controlled, indicate that this method of treatment is superior to other methods employed in the past. Complications such as leukemia may be produced, and adequate observation is essential in order to prevent severe damage to the bone marrow.

At present it may be concluded that there is adequate evidence to accept the palliative effect of radioactive phosphorus in leukemia and some allied disorders; whether more than palliative effect can be obtained by subsequent investigations into dosages and other technics of administration must be considered doubtful. Although radioactive phosphorus does not bring about a complete cure for polycythemia vera, it can produce a long-lasting remission of the clinical and hematologic manifestations. When the exigencies of the war are past, an adequate supply of radioactive phosphorus probably will be available; the preparation, however, must be administered with great care and circumspection. Its careless use can bring about disorders as serious as those which it is designed to relieve.

1. Therapeutic Trials with Radioactive Phosphorus, editorial, J. A. M. A. **115**: 2089 (Dec. 14) 1940; Medical Applications of "Atom Smashing," current comment, **115**: 862 (Sept. 4) 1940; Therapeutic Use of Radioactive Substances, **121**: 54 (Jan. 2) 1942.

2. Warren, Shields: The Therapeutic Use of Radioactive Phosphorus, Am. J. M. Sc. **209**: 701 (June) 1945.

3. Hall, Byron E., and others: Radioactive Phosphorus in the Treatment of Polycythemia Vera: Results and Hematologic Complications, Am. J. M. Sc. **209**: 712 (June) 1945.

PHYSICIANS AND ADOPTIONS OF BABIES

In pioneer days the family physician was naturally the person with whom to discuss the adoption of a baby. He knew the unwanted babies. He was expected to maintain secrecy and to respect confidences. For many years the informal adoptions arranged by physicians were as satisfactory a way as could be found. Physicians have continued to function in this capacity. Here and there abuses have been observed, but the vast majority of physicians, in arranging adoptions, do so without profit to themselves and with a view only to the advantage of the baby, the real parents and the foster parents. Many nonmedical abuses have crept into the field of adoption. "Baby farms" and disreputable foster homes, in which unwanted babies were left and from which they are taken by foster parents, often profit both ways from such transactions; they charge mothers for "care" of the baby, often at prohibitive rates; they charge the foster parents all that the traffic can bear.

The control of illicit traffic in babies requires that all adoptions should be a matter of public concern. The state, in taking control, has developed certain general principles which have been republicized by the United States Children's Bureau.[1] Press releases include a comprehensive description of a desirable adoption law covering many points. The general principles which should govern adoption are set forth by the bureau as follows:

1. Adoption proceedings should be held before a local court accustomed to handling children's cases; petitioners for adoption should reside and be known locally.
2. The court should have the assistance of the state welfare department, which should be made a party to every adoption proceeding.
3. Consent to adoption should be obtained from natural parents or other persons or agency having legal responsibility.
4. Court hearings should be closed and records confidential.
5. A trial period of residence, preferably for one year in the adopted home, should be required prior to issuance of the final adoption decree.
6. Provision for removal of children from unsuitable homes should be made as well as provision for their care and guardianship after such removal.
7. All applicable statutes should assure the welfare of the child and the rights and obligations of the parents.

The children of unmarried mothers are particularly subject to possible abuses because of the desire to conceal the illegitimate birth, the emotional state of the mother at the time of birth and the consequent tendency to act rashly in a manner which will be regretted later.

The Children's Bureau declares [1] that not more than one fourth of the states have adoption laws which approximate the standards set forth, although within the last five years about forty states have improved their legislation in some respects.

In view of the increasing complexity of legal and sociologic implications involved in adoption state laws may eventually establish specialized agencies to supervise the adoption of children and the physician's role in that field will be restricted. Much of the abuse now present in the field can be minimized by the enactment and enforcement of adequate laws respecting child placement agencies.

1. U. S. Dept. of Labor, Children's Bureau, Washington, Press Release, Jan. 22, 1945.

"PSEUDODOXIA PEDIATRICA"

Under the heading "pseudodoxia pediatrica" Bakwin [1] calls attention to a number of doubtful practices in current use among pediatricians. The worst offender among these, he believes, is indiscriminate tonsillectomy. The American Child Health Association, some ten years ago, surveyed a group of 1,000 children 11 years of age from the public schools of New York City; 61 per cent had had their tonsils removed. The remaining 39 per cent were subjected to examination by a group of physicians who, in turn, selected 45 per cent of these for tonsillectomy and rejected the rest. The rejected children were reexamined by another group of physicians, who recommended for tonsillectomy 46 per cent of those remaining after the first examination. When the rejected children were examined a third time, a similar percentage was selected for tonsillectomy, so that after three examinations only 65 children remained who had not been recommended for the operation. Apparently the chance that a child would be recommended for operation depended principally on the physician rather than on the status of the child's health. In groups of children with severe dental caries and visual handicaps for which nothing had been done, about 60 per cent were submitted to tonsillectomy. Another operation often performed without sufficiently specific indications is myringotomy. The author showed at Bellevue Hospital, before the use of sulfonamide drugs, that the incidence of purulent otitis media in infants could be greatly reduced by limiting otoscopic examinations and adhering to stringent criteria for myringotomy.

We are rather proud of our record of deliveries of mothers in hospitals in the United States. Bakwin reminds us, however, that data are not available to prove that indiscriminate hospitalization for delivery has had a favorable influence on either maternal or neonatal mortality. There is material for thought in the report of the Frontier Nursing Service of Kentucky.

1. Bakwin, Harry: Pseudodoxia Pediatrica, New England J. Med. 232: 691 (June 14) 1945.

The service has reported a maternal mortality of 0.75 per thousand births in its first 4,000 deliveries, as compared with 5.6 for the white population of the United States of the same time. These deliveries were done in homes which were extremely poor. Operative deliveries were rare, and stillbirth and neonatal death rates did not differ significantly from those of the country as a whole.

Bakwin believes that hospitals are unsuited for the care of the newborn. The obstetric nurseries are crowded and expose the infants to epidemics, particularly those of diarrhea. Pneumonia, sepsis and other infections are not infrequent. These conditions are rare in the home. Recent studies suggest that the separation of mother and baby, as practiced in hospitals, is unnatural and unphysiologic. The system of bringing babies to their mothers only at fixed intervals and allowing them to remain for limited periods, he argues, is not conducive to proper breast feeding, especially during the first three weeks of life. Bakwin readily agrees that the hospital is the proper place for the delivery of selected patients when difficulties are anticipated, but he feels that some modification of the present system of indiscriminate delivery in hospitals should be made.

Among many fallacies resulting principally from rationalization without scientific check, those pertaining to the field of nutrition offer a fruitful field. Infants are fed vitamins, although there is not definite clinical evidence that deficiency diseases are common among children or that any benefit can be derived from the general use of vitamins except in the case of vitamins C and D in infancy. The major fallacy, Bakwin points out, is to think that the appetite cannot be trusted in the selection of a proper diet and that laboratory investigations have progressed to the stage where they can be trusted to make such a selection. He insists that eating should mean roasts, sauces, puddings or pies rather than calories, vitamins and minerals, and that if he was to choose between chef and dietitian he would choose the chef.

Explanation for the continuation of these practices, according to Bakwin, is the tendency to accept ideas rather than to question them and subject them to experiment and clinical control. The indifference of the academic pediatrician to the details of everyday practice, the type of training given to the future pediatrician and his orientation toward his practice are all factors. The physician often feels that he must do something; in his anxiety to act he frequently does too much to the detriment of both the child and the parent.

The iconoclast is not new in medical science. The continuous questioning of its own theories and practices is conspicuous in modern medicine. Iconoclasm serves a useful purpose. Let us remember that often the results serve to restore new faith in old methods, by placing them on firmer foundations.

Current Comment

THE ANTIRETICULAR CYTOTOXIC SERUM OF BOGOMOLETS IN THE TREATMENT OF RHEUMATISM

The therapeutic agent called the antireticular cytotoxic serum of Bogomolets (A C S) is based on the concept that the connective tissue of an organism contains a number of hitherto uninvestigated physiologic functions. The aim of the serum is to stimulate these functions and to intensify active immunity. The serum is produced by the immunization of horses with the cells of the spleen and bone marrow taken from a human corpse. The determination of the amount of cytotoxins in the serum obtained is important. The amount of cytotoxins in the serum of the immunized animal can be determined by applying a modification of the reaction of complement fixation (reaction of Bordet-Gengou); that is, by using an antigen for the reaction of complement fixation, the same antigen as is used for the immunization of the animal. The strength of the serum is determined by ascertaining the dilutions at which it still gives a complete fixation of the complement. Therapeutic serums are those which give a complement fixation in a dilution of not less than 1:100. The serum is injected subcutaneously in an isotonic solution in the dilution of 1:10. The stimulating dose of the diluted serum equals 0.3-1.0 cc. Small doses of cytotoxic serum have a stimulating effect, whereas large doses have an inhibitory effect. The reactivity of the physiologic system of connective tissue can be determined, according to Bogomolets, by a number of tests such as the dermal tests with trypan blue, blood morphology, the sedimentation speed of erythrocytes, the titer of the complement, the opsonic index and the phagocytic activity of the leukocytes. Among the numerous conditions in which the serum is supposed to exert a favorable effect is "rheumatism." In a report to the Empire Rheumatism Council on the action of this serum in 48 selected patients representing various types of "rheumatism," Francis Bach [1] states that his investigation does not support the claim that the antireticular cytotoxic serum of Bogomolets is a cure for "rheumatism." Definite subjective improvement was observed in only 7 of this group, while in another 7 there was slight improvement. Of the 3 cases of rheumatoid arthritis which showed definite improvement, there was a relapse two months later. Bach suggests that the type of the case and the stage in the pathologic process that has been used for this preliminary study are probably not those which Professor Bogomolets had in mind. In fact, when asked for an opinion regarding this report, Bogomolets stated that he has come to believe that his serum is suitable only in the acute phase of the rheumatic disease. Professor Strozhesko, one of Russia's prominent internists, in whose clinic the action of the serum in rheu-

1. Bach, Francis: A. C. S. Serum of Professor Bogomolets in the Treatment of Rheumatism, Ann. Rheumat. Dis. 4: 62 (March) 1945.

matism was studied, stated that the serum in stimulating doses produces the best effect with infectious diseases in what he calls the allergic period of their course. The efficiency of this serum in rheumatic conditions is at least doubtful. The burden of proof is still on the proponents.

THE GIBSON ISLAND CONFERENCES ON CHEMISTRY

The special research conferences on chemistry and its allied fields, held at Gibson Island under the auspices of the American Association for the Advancement of Science, are now in session. The recent conference on medicinal chemistry bore testimony to the current interest in antibiotics and their role in chemotherapy. Prospects for several competitors or collaborators with penicillin are encouraging. That the chemists have not abandoned the search for symptomatic remedies, however, was borne out by the interest shown in new analgesics, antispasmodics and antithyroid compounds. In the case of the chemotherapeutic agents as well as of the pharmacodynamic agents, great interest attaches to the relation of chemical structure to biologic activity. As was repeatedly brought out in the discussions, such relationships are important in directing the synthesis of new compounds but have a limited predictive value as to the merits of a new compound synthesized to specifications. As the testing and appraisal of new drugs is often more arduous and time consuming than their preparation there is a virtual log jam of new compounds awaiting tests and appraisal. Abbreviated "screening methods" are necessarily employed but could not be expected to be wholly satisfactory.

MEDICAL BOOK REVIEWS

The quality of reviews of books in the field of medicine in five representative medical journals has recently been evaluated.[1] The criteria by which the contents of the reviews were judged were discussion of author's qualifications and basis of his work; indication of whether the book is a reference book, textbook or manual; indication of the author's purpose in writing the book, his objectives and point of view; inclusion of subject matter covered, as well as scope of book; format, type, illustrations, plates and bibliographies; indication of manner of treatment, style of writing and effectiveness; indication of the accuracy of the author's statements, and inclusion of comparison with related books in the field or similar books by the same author. By rating the five journals from 0 to 5 on these criteria, it was found that THE JOURNAL, with an average of three or better on four different points, namely, purpose, subject, reliability and form, obtained the highest rating of the five periodicals with a total average score of 2.5. This study and its conclusions furnishes objective evidence of the reliability and value of the reviews published in THE JOURNAL.

1. Wilson, Julia E.: An Evaluation of Medical Book Reviews: A Preliminary Study, Bull. Am. Lib. A. **33**: 305 (July) 1945.

INTELLIGENCE AND SEX

There is no difference in mean intelligence between boys and girls. This fact has been shown repeatedly by adequate studies of performance of boys and girls when subjected to modern methods of intelligence testing. There is, however, a real, i. e. statistically valid, difference in the degree of variance of intelligence between boys and girls. There are more boys at both extremes of intelligence—brighter and duller—than there are girls. Roberts,[1] in a thoughtful discussion of this subject, states that in the one thousand "cleverest" or "dullest" children out of ten thousand there are 534 boys to 466 girls, or a ratio of 115 boys to 100 girls. This variance increases as one approaches the extremes of intelligence. Thus in the final 0.1 per cent at the highest and lowest intelligence levels there are nearly twice as many boys as girls. That boys are so much more variable than girls in regard to general intelligence is one of the most curious facts in human biology, especially in view of the lack of difference in mean performance. There is no doubt as to the reality of the phenomenon. Roberts, probably correctly, eliminates any differential cause due to education during school or preschool life and concludes that the difference is almost certainly genetic, but in what manner this is brought about is at present completely obscured.

MORE HOME CANNING

Every indication points to the need for matching again this year the record set for home canning during 1944, when nearly one half of the total canned vegetables and two thirds of the canned fruits used by civilians were home canned. The War Food Administration has prepared numerous suggestions on means of disseminating information for the promotion of home canning. These include the use of radio, clubs, schools, churches and demonstration centers to interest the housewife in food preservation and to assist her in every way possible. The problems of home canning this year are further complicated by the necessary cut in the allotment of sugar for this purpose. This obstacle can be overcome in part by the use of numerous methods of preservation which require little or no sugar. Fruits may be kept from spoiling by processing without sugar or by substituting part corn syrup or honey. The drying of fruits in home built dehydrators does not require sugar. More pressure cookers are available this year, without priority, through regular commercial channels, for efficient canning of vegetables other than tomatoes. Instructions for the use of these canning procedures and equipment are provided in the many publications of the Department of Agriculture and the War Food Administration. The campaign to acquaint the public with the need for more canning and better canning is much to the point in view of the nation's food situation.

1. Roberts, J. A. F.: The Difference Between the Sexes in Dispersion of Intelligence, Brit. M. J. **1**: 727 (May 26) 1945.

MEDICINE AND THE WAR

ARMY

56th PORTABLE SURGICAL HOSPITAL

The 56th Portable Surgical Hospital was recently recognized for superior and meritorious service while attached to the veteran 33d Infantry Division during the rugged fighting in the Benguet Mountains of northern Luzon. Commanded by Major Evan C. Reese of Stroudsburg, Pa., the 56th Portable Surgical Hospital was awarded the Meritorious Service Unit Plaque by Major Gen. P. W. Clarkson, commanding the 33d (Prairie) Division, which liberated Baguio. The citation stated that "the excellent care given patients has resulted in the saving of many lives and in returning many casualties to a full duty status. The 56th Portable Surgical Hospital achieved and maintained a high standard of military discipline throughout the entire Baguio campaign."

FIRST MEDICAL OFFICER TO BE DISCHARGED UNDER POINT SYSTEM

The Office of the Surgeon General stated recently that Major Wallace P. Ritchie, St. Paul, will be the first medical officer to leave the Army under the point discharge system. He has 121 points, having served thirty-three months overseas in England, North Africa and Italy. Dr. Ritchie graduated from Johns Hopkins University School of Medicine, Baltimore, in 1931 and entered the service Feb. 15, 1942.

GENERAL BURSTON OF AUSTRALIA IN THE UNITED STATES

Major Gen. S. Roy Burston, Director General of Medical Services of the Australian Military Force, was in Washington recently, where he conferred at the Office of the Surgeon General. He arrived in this country on an inspection trip during which he will visit military medical installations and medical foundations in the United States and Canada.

ARMY AWARDS AND COMMENDATIONS

Captain Herman Schneck

Capt. Herman Schneck, formerly of New York, was recently commended "for superior performance of duty and maintenance of medical facilities." The commendation read, in part, "You have imbued all members of this command with profound confidence in your ability, by skilful and efficient treatment of the many and varied cases that have developed here, and we all feel that we are indeed fortunate to be in such good hands. Recently pictures have been taken of the post dispensary and war building by photographers dispatched from department headquarters, with the intention of publishing them as models. . . . The undersigned is well aware of the poor facilities that existed at this post prior to your arrival, and it is desired that you receive full credit for the present condition of the medical facilities of this post, which have been so well liked by our superior headquarters and have caused this signal honor to be conferred on our command." Dr. Schneck graduated from the New York University College of Medicine, New York, in 1917 and entered the service Dec. 3, 1942.

Major Homer W. Humiston

Major Homer W. Humiston, formerly of Tacoma, Wash., was recently presented with the Bronze Star, accompanied by a citation "for meritorious service in connection with military operations against the enemy on Leyte, P. I., from Nov. 24 to Dec. 25, 1944. As assistant chief of the surgical service Major Humiston rendered a type of surgery to wounded soldiers and civilians that was outstanding. In addition to spending long hours in the surgery, he supervised the preoperative and serious postoperative wards in a manner that was worthy of merit. By his skill as a surgeon plus his devotion to the patients, Major Humiston saved the lives of many men as well as hastening the recovery of others less seriously injured." Dr. Humiston graduated from Harvard Medical School, Boston, in 1925 and entered the service Nov. 5, 1942.

Major Hildrus A. Poindexter

The Bronze Star was recently awarded to Major Hildrus A. Poindexter, formerly of Washington, D. C., "for meritorious service in support of military operations against the enemy at an island base in the Southwest Pacific Area. During the period of June 15, 1944 to Oct. 30, 1944 Major Poindexter not only acted in the capacity of an infantry division malariologist but also performed the additional duties of an island command malariologist. By his faithful, energetic, aggressive and skilful work on the problems of malaria control, the rate of malaria fever among members of the command was materially reduced. Major Poindexter's services reflect credit on himself and on the military service." Dr. Poindexter graduated from Harvard Medical School, Boston, in 1929 and entered the service April 22, 1943.

Lieutenant Colonel Eugene F. Melaville

Lieut. Col. Eugene F. Melaville, formerly of Rochester, N. Y., was recently awarded the Bronze Star for "meritorious achievement in connection with military operations against the enemy on Peleliu Island, Palau Group, from Oct. 4 to Nov. 27, 1944. In the absence of normal third echelon medical service, the facilities of the division clearing company and a portable surgical unit were combined to hospitalize wounded and sick of the division and attached units. . . . By his untiring effort and vigilant supervision, Colonel Melaville made a splendid contribution to the efficient hospitalization furnished the division in the Palau Islands." Dr. Melaville graduated from Washington University School of Medicine, St. Louis, in 1938 and entered the service July 1, 1942.

Captain Robert S. Hormell

In recognition of his "outstanding conduct in the performance of duty," Capt. Robert S. Hormell, formerly of Boston, was recently commended by Major Gen. R. G. Breene, U. S. Army, the citation reading that Captain Hormell, "by denying himself sleep and rest did, during the month of April, save the life of a colored soldier who was severely burned and injured in a gasoline explosion on April 4, 1943. For the first forty-eight hours following this accident this officer remained constantly at the side of the injured soldier, and as a result of his personal knowledge and skill and through his perseverance when the rest of the staff despaired of this soldier's life, the soldier's life was saved." Dr. Hormell graduated from Harvard Medical School, Boston, in 1939 and entered the service June 1, 1942.

Major Thomas R. White

A Distinguished Flying Cross was recently awarded to Major Thomas R. White, formerly of Redlands, Calif., for "extraordinary achievement while participating in a highly destructive raid on the Japanese mainland on April 18, 1942. These officers and enlisted men volunteered for this mission knowing full well that the chances of survival were extremely remote and executed their part in it with great skill and daring. This achievement reflects high credit on them and on the military service." Dr. White was also awarded the Silver Star and the Military Order of China. Dr. White graduated from Harvard Medical School, Boston, in 1937 and entered the service Aug. 15, 1941.

NAVY

PHYSICAL REQUIREMENTS FOR DUTY ABOARD SUBMARINE

Lieut. Comdr. J. J. Blanch, senior medical officer aboard a submarine tender in the Pacific, recently outlined the rigid physical requirements for duty aboard a submarine, as follows: The submarine man should be lean and agile so as not to take up too much space aboard the subs, which are very cramped for space. A slender person can also get around much easier. He must have 20/20 uncorrected vision and be able to hear a standard navy clock at 40 inches. He must not be afflicted with chronic throat trouble, nor must he have a fungous infection allergy. The sub man must meet special dental requirements, since there is no way of rendering dental aid while on patrol. A man suffering from claustrophobia does not qualify. A near-perfect physical specimen, who is cool and not easily perturbed during an emergency, is the type of man for the submarine service. Since the crew on a submarine is comparatively small, every man must be physically able to perform his job well under all circumstances. When submarines return to a tender following a patrol, the crew, after being examined physically, are sent to a rest camp for two weeks, during which time an emergency crew aboard the tender prepares the boat for action again.

NAVY AWARDS AND COMMENDATIONS

Commodore John Paul Owen

The Legion of Merit was recently awarded to Commodore John Paul Owen, formerly of Oak Grove, Mo., who was cited "for exceptionally meritorious conduct in the performance of outstanding services to the government of the United States as medical officer in command of the Naval Hospital, Navy Yard, Mare Island, Calif., from Nov. 11, 1942 to March 1, 1945. Exercising sound judgment and outstanding technical ability, Commodore Owen rendered valiant service in carrying out the varied and complex details of his vital assignment, laboring tirelessly and with unceasing diligence in expanding his hospital to meet the demands of ever growing lists of casualties returned from battle fronts all over the world. In addition to his administrative duties at the hospital, he undertook the development of a plastic artificial limb which has been extensively recognized in medical and scientific fields and universally adopted as an orthopedic device of inestimable value in rehabilitating wounded men of all Allied Nations, supervising the manufacture of the new device on the premises. By his superior knowledge, expert professional skill and zealous devotion to this extremely vital task, Commodore Owen served as a constant inspiration to the returning veteran in resuming his normal place in society." Dr. Owen graduated from St. Louis University School of Medicine in 1913 and entered the service April 14, 1917.

Lieutenant Jack C. McCurdy

Lieut. Jack C. McCurdy, formerly of Marshall, Texas, was recently presented with the Navy Unit Commendation Ribbon for the First Provisional Marine Brigade in recent ceremonies at the Naval Air Station, Pensacola, Fla. He is now attending the School of Aviation Medicine in Pensacola preparatory to receiving the wings of a flight surgeon. Already the holder of a Navy Cross and the Purple Heart, Dr. McCurdy was attached to the First Provisional Marine Brigade for one year and was with it during the assault on Guam. It was during that period, from July 21 to Aug. 10, 1944, that the brigade won the Navy Unit Commendation. He won the Navy Cross for his action during the first day of the assault on Guam while he was attached to a Marine battalion. He was also wounded during the Guam battle. Dr. McCurdy graduated from Tulane University of Louisiana School of Medicine, New Orleans, in 1941 and entered the service Jan. 5, 1942.

MISCELLANEOUS

QUINACRINE HYDROCHLORIDE (ATABRINE) FOR CIVILIANS

The War Production Board recently announced that the military services have stated that a small percentage of veterans now being discharged from the services will require some form of antimalarial treatment during periods of relapse of this disease. Quinacrine hydrochloride (atabrine) is readily available in adequate supply to meet civilian requests for both oral and parenteral use, according to the War Production Board. Quinine may be obtained in ampule form for parenteral use when required, but it is not available for oral use. However, totaquine U. S. P., representing the total alkaloids of cinchona bark, is available for oral use in quantities sufficient to meet all requests for natural antimalarials.

Physicians and patients who require such medication should purchase their supplies from local druggists or other sources of pharmaceutical products. Occasionally local druggists, particularly those in the Northern sections of the country, may not have stocks of quinine ampules, totaquine or quinacrine hydrochloride (atabrine) on hand. Under such circumstances the druggists should be requested to obtain the desired items from wholesalers or from the manufacturers of these products, through their usual channels of distribution.

PHYSICIANS WITH THE VETERANS ADMINISTRATION

At the suggestion of the Secretary of War, the Administrator of Veterans Affairs has agreed that the Readjustment Regulations will be applicable to Medical Corps officers assigned to the Veterans Administration. When the critical adjusted service rating score has been formally announced, officers who are assigned to the Veterans Administration may be relieved from active duty the same as officers who are serving with the Army under these regulations. Attention is also called to the fact that any Medical Corps officer assigned to the Veterans Administration has the privilege to request relief from active duty under the provisions of section III or IV, War Department Circular 485, dated Dec. 29, 1944. If an officer submits a request for relief from active duty under section III, he must accompany his request with a statement from the executive officer, Procurement and Assignment Service, War Manpower Commission, showing the need for his services in a community.

HOSPITALS NEEDING INTERNS AND RESIDENTS

The following hospitals have indicated to the Council on Medical Education and Hospitals that they have not completed their house staff quota allotted by the Procurement and Assignment Service:

(Continuation of list in THE JOURNAL, July 21, page 887)

CONNECTICUT

Norwich State Hospital, Norwich. Capacity, 2,600; admissions, 737. Dr. Riley H. Guthrie, Superintendent (4 residents—psychiatry, 3 disqualified for military service).

Waterbury Hospital, Waterbury. Capacity, 372; admissions, 8,402. Miss Aida E. Creer, R.N., Superintendent (interns, April and July; resident, April).

KENTUCKY

Louisville General Hospital, Louisville. Capacity, 587; admissions, 9,971. Dr. John W. Moore, Medical Director (assistant resident—pediatrics, disqualified for military service).

MASSACHUSETTS

Cambridge Hospital, Cambridge. Capacity, 272; admissions, 6,078. Dr. F. A. Washburn, Medical Director (interns; assistant resident, discharged medical officer).

NEW YORK

Goldwater Memorial Hospital, New York City. Capacity, 1,660; admissions, 1,676. Dr. C. G. Scherf, Medical Superintendent (resident).

Metropolitan Hospital, New York City. Capacity, 1,183; admissions, 8,838. Dr. Randolph A. Wyman, Medical Superintendent (intern, October 1).

ORGANIZATION SECTION

Washington Letter

(From a Special Correspondent)

July 23, 1945.

A National Science Foundation

Legislation embodying the Kilgore subcommittee recommendation for creation of a national science foundation to oversee research of government agencies, industries and private organizations will be introduced this week by Senators Kilgore of West Virginia, Johnson of Colorado and Pepper of Florida. A bill already drawn by the subcommittee on war mobilization provides for a $15,000 a year director and a seventeen member national defense board, including the heads of the War, Navy, Interior, Agriculture, Commerce, Labor and Justice departments and the Federal Security agencies. The Kilgore proposal, following issuance of the Bush report, which advocated a nine member board, would create a foundation to distribute federal funds for research in the weapons of war, health and medical care, advancement of the basic sciences and other activities. Under the Kilgore plan, funds would be allocated as follows: Twenty per cent of an annual appropriation, total to be determined by Congress from year to year, appropriated annually to each of three main branches: national defense, health and medical care, and basic sciences. Funds would also be allocated to research on natural resources, methods, products and processes of value to small business, and on peacetime uses for wartime research and wartime facilities. At least 50 per cent of each year's funds would be earmarked for nonprofit educational institutions and research foundations. They would be "free to conduct their research work in a manner which they think most productive, subject only to routine supervision and review by the foundation."

Better Artificial Limbs Requested for Servicemen

More intensive research on the development of better artificial limbs for servicemen was urged by Representative Rogers of Massachusetts in the House. She said that they are not getting the best artificial limbs that science could devise. Ranking minority member of the House Veterans Committee, long interested in medical legislation, Mrs. Rogers did not blame the Army entirely for failure to provide better appliances for veterans but said that the War Department had ample funds to do more than has been done. She commended the project started under the direction of Gen. Brehon B. Somervell, commanding general of the Army Service Forces. Mrs. Rogers reported conversations with amputees at Walter Reed Hospital who said that their artificial limbs were none too comfortable or practical. Representative Miller of Nebraska, a physician, agreed with Mrs. Rogers that the army amputee center was not making entirely satisfactory artificial limbs.

Research Laboratories Studying Better Artificial Limbs

Coincident with criticism by House members of artificial limbs now supplied to servicemen were reports of how research is being pressed in laboratories of General Motors, Northrop Aircraft and other war plants in an effort to make better artificial arms and legs. It is reported that some of the new technics and materials used in the production of airplanes will be used to help provide wounded soldiers and sailors with the best artificial limbs. A belated effort is now said to be under way to solve the problem that Dr. Paul E. Klopsteg of Northwestern University, head of the research program set up by the government's Office of Scientific Research and Development, said "should have had attention years ago." It is claimed here that the government did nothing until a few months ago because the artificial limb industry, which is soon to be investigated by a federal grand jury, had strongly opposed suggestions that the government foster such research. It took some effort to convince high government officials that the research was necessary, it is stated. The American Legion has charged that "the manufacturers have neither the resources nor the equipment to engage in extensive research engineering unless government agencies assist." To this charge, which was forwarded to Brig. Gen. Frank T. Hines, former head of the Veterans Administration, Chester O. Hadden of Denver, official of the Gaines Artificial Appliances firm and president of the Association of Artificial Limb Manufacturers of America, is reported to have replied that the legion resolution was not based on fact. He said that members of the industry spend "many thousands of dollars year after year" in research and that "there is absolutely no necessity for the allocation of any federal funds for research in this field at the present time."

A Broad Program of Scientific Research

Better health, more jobs in peacetime and the development of new weapons of war are objectives of a broad scale, publicly financed program of scientific research, urged by Dr. Vannevar Bush, director of the Office of Scientific Research and Development, in a report to President Truman. Representative Jennings Randolph and Senator Warren R. Magnuson have proposed a bill to implement the Bush report. The report recommends that Congress establish a National Research Foundation with five divisions to study specific fields of study. An initial $35,000,000 program is urged, with costs to rise as work increases, to finance research and provide 24,000 undergraduate scholarships and 900 graduate fellowships to augment the roll of scientists. The Bush report is based on the findings of four committees of specialists, drafted in response to a request to him by the late President on Nov. 17, 1944. Three specific recommendations in Dr. Bush's report are that the foundation be formed to develop scientific research, financially support basic research in nonprofit organizations, encourage scientific talent in American youth by offering scholarships and fellowships and promote long range research on military matters; that the foundation consist of nine members to be elected by the President and be responsible to him, to serve four years and without compensation, and that the foundation have five divisions: medical research, natural sciences, national defense, scientific personnel and education, and publications and scientific collaboration. In urging government support of scientific research, Dr. Bush said that at present there are forty separate agencies in the government carrying on various forms of scientific work. Since 1930, he said, funds spent by the government and by industry for scientific research had increased from $140,000,000 to $309,000,000 in 1940. In the same period colleges and universities raised their expenditures from $20,000,000 to $31,000,000, while money spent by research institutes dropped from $5,200,000 to $4,500,000.

Women Physicians to Have Important Postwar Role

Women physicians, who before the war constituted less than 5 per cent of the 165,000 physicians practicing in the United States, will have a larger part in filling postwar medical needs, according to the Women's Bureau of the Department of Labor. A bureau report said that the war has greatly increased the demand for women physicians, both for the army and navy and to replace doctors who have gone into the armed forces. Only four out of the seventy-seven approved medical schools in this country now refuse admission to women. While women have tended to specialize in pediatrics, psychiatry and public health, it is expected that they will expand into other medical fields, including medical research and teaching, after the war.

U. S. Navy Studies New Age-Service Discharge Plan

The U. S. Navy is considering a new, age-service point system under which older reserve officers and enlisted men will be discharged or released to inactive duty. An estimated 11,600 officers and 19,000 enlisted men would be eligible for return to civilian life under the system by next December. The minimum points required range from 53 to 57, depending on the service branch, and the new plan calls for computing a man's "service age" by allowing one point for each year of age, plus an additional point for each four months of active duty since September 1 when Germany invaded Poland.

Bureau of Information

SUMMARY SHEETS FORM INDIANA AND PENNSYLVANIA

Completed county summary sheets have been received from each county in Indiana through Mr. Thomas Hendricks, secretary of the Indiana State Medical Society, and from each county in Pennsylvania through Dr. Walter F. Donaldson, secretary of the Medical Society of the State of Pennsylvania.

Pennsylvania

County [1]	Principal Cities [2]	Population	Physicians Under 65	Persons per Physician	Persons per Telephone [3]
Adams		37,079	14	2,649	13
	Gettysburg	5,916			
Centre		47,318	29	1,632	9
	State College	6,226			
	Bellefonte	5,304			
	Philipsburg	3,963			
Indiana		68,911	31	2,222	16
	Indiana	10,050			
	Blairsville	5,002			
	Clymer	3,082			
Lawrence		93,094	47	1,981	8
	New Castle	47,638			
	Ellwood City	12,329			
Lycoming		90,984	60	1,516	8
	Williamsport	44,355			
	S. Williamsport	6,033			
	Jersey Shore	5,432			
McKean		49,347	25	1,974	5
	Bradford	17,691			
	Kane	6,139			
Monroe		26,840	23	1,167	8
	E. Stroudsburg	6,404			
	Stroudsburg	6,186			
Perry		19,972	8	2,496	13
Snyder		18,427	9	2,047	21
	Selinsgrove	2,877			
Sullivan		6,048	3	2,016	10

Indiana

Adams		19,792	9	2,199	8
	Decatur	5,861			
Bartholomew		28,978	10	2,898	8
	Columbus	11,738			
Cass		34,266	12	2,856	7
	Logansport	20,177			
Clark		37,765	14	2,698	15
	Jeffersonville	11,493			
Dearborn		21,124	7	3,018	10
	Aurora	4,828			
	Lawrenceburg	4,413			
Hendricks		19,417	7	2,774	8
	Danville	2,093			
Lake		305,138	146	2,091	15
	Gary	111,719			
	Hammond	70,184			
	East Chicago	54,637			
Posey		18,461	4	4,615	9
	Mount Vernon	5,638			
Rush		17,299	6	2,883	6
	Rushville	5,960			
Shelby		24,264	11	2,206	9
	Shelbyville	10,791			

1. Bureau of Census, estimated population 1943.
2. Bureau of Census, population 1940.
3. Based on 1940 figures, American Telephone and Telegraph Company.

The accompanying table gives data from selected counties in each of these states. The column giving the number of persons per telephone is used as one index of the economic status of the area. Many physicians over 65 years of age are carrying on large practices and are doing much to maintain the health of communities. They are not included in computing physician population ratio, however, as the future needs of the communities will be largely dependent on younger physicians.

A current knowledge of needs of communities for doctors is essential if adequate help is to be given veteran medical officers in their problems of medical practice. These needs can be indicated on the summary sheets under "Remarks" by the state and county secretaries and are then available to inquiring medical officers. Frequent reports from state and county medical societies about needs of communities for doctors will help maintain current files and will increase the service of the Bureau.

With the information available on a completely filled out summary sheet, it is readily possible for an interested medical officer to make an initial selection of areas in which he might like to practice. Since vacancies are held open in many communities for doctors now in military service, further investigation by direct correspondence with state and county medical societies will always be necessary to insure an accurate report of the needs of individual communities.

Medical Legislation

MEDICAL BILLS IN CONGRESS

Scientific Research

Three bills have been introduced to promote the progress of science and the useful arts, to secure the national defense and to advance the national health, prosperity and welfare, S. 1285, introduced by Senator Magnuson, Washington, H. R. 3852, introduced by Representative Mills, Arkansas, and H. R. 3860, introduced by Representative Randolph, West Virginia. These bills undertake to effectuate the recommendations of the report submitted recently to President Truman by Dr. Vannevar Bush and other scientists who were requested by former President Roosevelt to suggest what the federal government should do to foster scientific research.

This legislation proposes to create a National Research Foundation to be composed of five divisions, including a Division of Medical Research. The foundation will be directed (*a*) to develop and promote a national policy for scientific research and scientific education; (*b*) to initiate and support basic scientific research and scientific development in the mathematical, physical and biologic sciences through contracts, grants or other forms of assistance; (*c*) to initiate and support scientific research and scientific development on matters relating to the national defense through contracts, grants or other forms of assistance; (*d*) to discover and develop scientific talent, particularly in American youth; (*e*) to grant scholarships and fellowships in the mathematical, physical and biologic sciences; (*f*) to foster the interchange of scientific information among scientists in this country and abroad; and (*g*) to correlate the foundation's scientific research and scientific development programs with those undertaken by public and private research groups.

The legislation would authorize to be appropriated annually such sums as may be necessary to carry out its provisions.

Industrial Health Hazards

Senator Johnston, South Carolina, for himself and Senator Ball, Minnesota, has introduced S. 1271, to provide for cooperation with state agencies administering labor laws and establishing and maintaining safe and proper working conditions in industry and in the preparation, promulgation and enforcement of regulations to control industrial health hazards. This bill is identical with the one introduced in the House of Representatives by Representative Norton, New Jersey, which is pending on the House calendar with a favorable committee report.

Official Notes

THERAPEUTIC TRIALS COMMITTEE

In the published statement of the October 1944 annual meeting of the Council on Pharmacy and Chemistry (THE JOURNAL, May 5, p. 29) announcement was made concerning the establishment of a Therapeutic Trials Committee. This committee has met in session on several occasions and on July 17 met with representatives of the American Drug Manufacturers Association and American Pharmaceutical Manufacturers Association to discuss procedure. In due time a formal announcement of the functions of this committee and the procedure by which it will serve will be published in THE JOURNAL.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

"Food Faddist" Arrested.—Paul O. Sampson, alleged food faddist, was arrested recently and booked at the Chico City Jail on four charges of violating the medical laws and the pure food laws of California. He was held in $2,000 bail and was finally released on personal recognizance to his attorney. Sampson was charged with violating the medical laws business and professional code for practicing a system of treating the sick without a license, newspapers reported.

Clair Turner Joins University of California.—Clair E. Turner, Dr.P.H., temporarily on leave from the Office of the Coordinator of Inter-American Affairs as health education officer, has been named in charge of the public health education program in the University of California School of Public Health, Berkeley, according to the University *Clip Sheet*. He will have the title of visiting professor of public health education. The course will be graduate in nature and will lead to the degree of master of public health.

Abortion Activities.—Newspapers reported June 12 the arraignment of Hester Ann Hesketh on a charge of murder in connection with the death of a young woman. It was stated that Mrs. Hesketh had admitted that she had performed from thirty to thirty-five abortions a week for the past two years and admitted too that she had been carrying on this activity since arriving in the state eighteen years ago. Her fees ranged from $25 to $75.——Clyde A. Pierson, D.O., San Bernardino, on May 25 was held legally convicted of abortion by the California fourth district court of appeals but the sentence to a prison term was cut in half, newspapers reported May 25. According to the opinion of a superior court judge, Pierson would have to serve one term of from two to five years and then serve a second term for the second and third counts combined, for which he was found guilty more than a year ago, it was stated. The appellate court decision stipulates that the conviction on two of the counts was not according to law. Pierson now has one conviction against him and must therefore serve one term. It was stated that this single conviction will be carried to the supreme court.——A chiropractor, Ramon S. Davis, on May 25 was being held by authorities in Los Angeles County for allegedly performing an illegal operation. Arresting authorities said that the chiropractor admitted performing the operation in a full confession, it was stated.

CONNECTICUT

Personal.—Dr. Creighton Barker, New Haven, secretary of the Connecticut State Medical Society, has been appointed a member of the board of trustees of the University of Connecticut, Storrs.——Joseph S. Fruton, Ph.D., associate in chemistry at the Rockefeller Institute for Medical Research, New York, has been appointed associate professor of physiologic chemistry at Yale University, effective July 1

Display Honors Dr. Winslow.—The Yale Medical Library has arranged a special exhibit in recognition of the services of Charles-Edward A. Winslow, Dr.P.H., senior member of the faculty of the Yale University School of Medicine, who was to retire in his position as professor of public health at the end of the recent school year (THE JOURNAL, March 31, p. 865). The exhibit includes early writings on hygiene beginning with Galen and a copy of the rare first edition of Sir John Harington's "Metamorphosis of Ajax," which described his invention of the water closet. Five display cases are devoted to Dr. Winslow's own writings.

DISTRICT OF COLUMBIA

Georgetown Opens Campaign for Funds.—Georgetown University Hospital has launched a campaign for funds to build a new institution. The campaign goal is $750,000, the same sum needed to supplement and guarantee a federal grant of $1,820,000 provided under the Lanham act for construction of the new building. The proposed hospital is to have 400 beds and will be erected adjacent to the university medical and dental schools. The new building will replace the old Georgetown University Hospital, which has a capacity of 241 beds and which was erected in 1898.

FLORIDA

Personal.—Dr. Hubert A. Barge, Miami, has been awarded the Algernon Sydney Sullivan medal of Mercer University, Macon, Ga. The medal is given annually to the most prominent alumnus of the school. According to the Jacksonville *Times-Union*, Dr. Barge, who graduated in 1918 at the school, has been instrumental in obtaining buildings and endowments valued at more than five million dollars to the university since 1934.——Dr. John S. McEwan, Orlando, has been appointed a member of the Florida Crippled Children's Commission to succeed Dr. Sanford C. Colley, Mount Dora, whose term expired.

ILLINOIS

Hospital Survey.—Governor Dwight Green has designated and authorized the state department of public health to carry on a survey of hospital facilities in the state of Illinois. Six persons representing the hospital field are to be appointed shortly by the governor and will be included in the overall advisory committee, which will consist of about forty members representative of labor and various civic organizations. A small technical subcommittee will be made up of hospital representatives and physicians. The development of the project is credited to the council on government relations of the Illinois Hospital Association.

Tumor Diagnostic Clinic Established.—A tumor diagnostic service has been organized at the Christian Welfare Hospital in East St. Louis to be conducted under the auspices of the state department of public health through its division of cancer control. The unit will provide a consultation service for practicing physicians of the area in the care of their suspected tumor cases. Similar services are now functioning under the auspices of the state department of health at the Memorial Hospital, Springfield; Burnham City Hospital, Champaign; St. Anthony's Hospital, Rockford, and the Research and Educational Hospitals of the University of Illinois College of Medicine at Chicago.

Ringworm of the Scalp Must Be Reported.—Dr. Roland R. Cross, director of the state department of public health, has announced that effective July 10 all cases of ringworm of the scalp occurring in Illinois must be reported to the official public health authority having local jurisdiction. Children infected with the disease shall be excluded from schools, theaters and public places until all lesions have healed. Placarding of homes and complete isolation will not be required, but disinfection of all towels, washcloths and head coverings of all articles used by patients will be enforced. All persons under 15 years of age that have been in contact with the patients should be inspected for evidence of the infection.

Chicago

Special Society Elections.—New officers of the Chicago Society of Allergy include Drs. John Peters, Oak Park, president, William A. Mowry, Madison, Wis., president-elect and Edward G. Tatge, Evanston, secretary-treasurer.——Drs. J. Daniel Willems was chosen president of the Chicago Society of Industrial Medicine and Surgery, Karl G. Rundstrom vice president and Frank P. Hammond secretary-treasurer.

Lectures on Health.—Dr. Harry M. Hedge, assistant professor of dermatology, Northwestern University Medical School, gave the first lecture July 18 in a summer lecture series given at the Museum of Science and Industry with the museum, the Chicago Medical Society and the Illinois State Medical Society cooperating. His subject was "Care of the Skin and Cosmetics." Dr. Chauncey C. Maher, associate professor of medicine, Northwestern, gave the second lecture July 25 on "High Blood Pressure." Others in the series include:

Dr. Emil D. W. Hauser, assistant professor of bone and joint surgery at Northwestern, Our Walk Through Life, August 1.

Dr. Leon Unger, assistant professor of medicine, Northwestern, Hay Fever and Prevention of Asthma, August 8.

Dr. Edward A. Piszczek, assistant professor of public health and preventive medicine, Loyola University School of Medicine, Infantile Paralysis, August 15.

Dr. H. William Elghammer, clinical professor of pediatrics at Loyola, Getting Along with Your Children, August 22.

Time Limit Extended for Hospital Trust.—The time in which the University of Chicago may build the projected Charles Gilman Smith Hospital for treatment of contagious diseases, without losing the income from a $500,000 trust fund left in 1907 by Mrs. Annie W. Durand for maintaining a wing of the institution, was extended July 10 for five years, or until June 28, 1950, by Judge Julius H. Miner in Circuit Court. According to the Chicago *Sun* the hospital, the construction of which was about to begin at the outbreak of the war, is to be built through the pooling of University of Chicago funds with funds from three estates: those of Mrs. Harriet G. Smith,

widow of Charles Gilman Smith; of Mrs. Durand, and of Robert McCormick, son of the late Harold F. McCormick and Edith Rockefeller McCormick. Mrs. Durand was the founder of the old Durand Hospital, at Flournoy and Wood streets, which was closed in 1933.

MARYLAND

Dr. Cameron Chosen Welfare Medical Care Officer.—Dr. William R. Cameron has been chosen assistant director of welfare for medical care, subject to approval by the city service commission, according to *Baltimore Health News*. Dr. Cameron, who has been serving with the U. S. Public Health Service as city health officer of Charlotte, N. C., formerly served as health officer for Hagerstown and Washington County. He was also director of the survey of medical care in the counties of Maryland. The welfare position is a newly created one.

MISSOURI

Representatives Pass Resolution for Physician.—The Missouri House of Representatives passed a resolution of respect on May 26 for Dr. George W. H. Presnell, mayor of Sikeston, who died May 26. The resolution eulogized Dr. Presnell for his service as alderman, mayor of Sikeston for three successive terms and his period of service as president of the Scott County Medical Society.

Appointments to State Board of Health.—Governor Phil M. Donnelly has made the following appointments to the state board of health for four year terms: Drs. George E. Knappenberger, Kansas City, to succeed Ira H. Lockwood, Kansas City; Frank H. Rose, Albany, to succeed John I. Byrne, St. Joseph, and Ralph A. Kinsella, St. Louis, to succeed Cleveland H. Shutt, St. Louis. Other members of the board include Drs. Robert M. James, Joplin, recently appointed state commissioner of health (THE JOURNAL, April 21, p. 1066); Charles H. Neilson, St. Louis; Howard B. Goodrich, Hannibal, and Hardin M. Henrickson, Poplar Bluff.

NEW YORK

Graduate Lectures.—Dr. Ellery G. Allen, Syracuse, will address a meeting of the staff of the Memorial Hospital of Greene County and the Greene County Medical Society in Catskill, September 27, on "Practical Considerations of Blood Dyscrasias." Dr. Ivan Hekimian, Buffalo, will address the two groups October 25 on "Practical Application of Hormonal Therapy." The meetings have been arranged by the council committee on public health and education of the state medical society.

New York City

Restrain Distribution of Spectrochrome.—The United States government was permitted on June 26 to restrain Dinshah P. Ghadiali, president of the Spectrochrome Institute of Malaga, N. J., from distributing his "all-curing machine" when an all woman jury returned a verdict in favor of the federal government in a civil action, according to the New York *Times*. Ghadiali was his own counsel and held that people can be healed by the spectrochrome machine through the use of colored lights. In summing up, assistant U. S. Attorney Morris K. Siegel said that Ghadiali "was a man preying upon the gullibility of people for his own personal profit. The federal government had taken action, he said, to stop gullible people from spending $90 for the purchase of the machine. The government has tried to show that this machine has no healing powers, but it was the imagination of many people that they were cured of their illnesses by submitting themselves to so-called treatment through this machine," Mr. Siegel stated.

Honor Memory of Lewis Stimson.—Dr. George J. Heuer, professor of surgery, Cornell University Medical College, has been appointed the first Lewis Atterbury Stimson professor of surgery, a position created under the will of Dr. Stimson's daughter, Miss Candace Stimson. The gift represents an endowment of more than $600,000 and will serve as a memorial to the first professor of surgery at Cornell, who held the position from 1898 to 1917, when he died. Coincidental with the announcement of the new professorship was one reporting the presentation of a portrait of Dr. Stimson to the college by Hon. Henry L. Stimson, Secretary of War, son of the late physician. Special ceremonies were held at the medical college to mark the presentation of the portrait and the endowment. Speakers included Dr. Lewis Atterbury Conner, a cousin of the late Dr. Stimson, Dr. Heuer and Dr. Philip M. Stimson. The late physician graduated at Bellevue Hospital Medical College in 1874. A personal friend of Pasteur, Dr. Stimson taught for many years as professor of physiology, anatomy and surgery at the University and Bellevue Hospital Medical College and in 1898 collaborated with the late Oliver H. Payne in founding the Cornell University Medical College.

Food Poisoning Traced to Cadmium Plated Pump.—The sudden illness of 5 persons after drinking strawberry soda at a soda fountain June 26 has been traced to the use of a cadmium plated syrup pump, according to the New York City Department of Health, July 12. All of the patients recovered. The New York City sanitary code forbids the use of cadmium on food utensils, refrigerator trays and similar items. Even a minute quantity of cadmium dissolved by the acid of fruit juice or syrup is capable of causing violent vomiting and severe distress. The investigation of the illness of the 5 persons, conducted by the health department, disclosed that all of the persons had become ill after drinking a strawberry soda made from syrup and carbonated water. No other foods had been eaten in common by any of the victims. The health department seized all pumps in the fountain for chemical examination, and it was found that the pump used for the strawberry syrup was cadmium plated. Syrup from the pump was also found to contain traces of the dangerous metal. Further investigation disclosed that the entire fountain unit containing the pump had not been used for eight years and had been placed in operation by the new owner of the fountain one week prior to the poisonings.

NORTH CAROLINA

G. M. Cooper Honored.—The woman's auxiliary to the Medical Society of the State of North Carolina recently named a bed at the Eastern North Carolina Sanatorium, Wilson, for Dr. George M. Cooper, Raleigh, assistant state health officer and director of the division of health education, state board of health.

Personal.—Dr. James A. Whitaker has resigned as health officer of Rocky Mount to join the staff of the Columbia Presbyterian Hospital, New York.—Dr. Louis G. Beall was recently named acting superintendent of the State Hospital at Morganton, succeeding Dr. John R. Saunders, resigned (THE JOURNAL, April 28, p. 1140).

OHIO

Personal.—Col. Harold Wellington Jones, M. C., librarian of the Army Medical Library, Washington, D. C., received the honorary degree of doctor of laws during the commencement of Western Reserve University, Cleveland, June 13.

New Departments Created at Western Reserve.—Through the division of the department of hygiene and bacteriology at Western Reserve University School of Medicine, Cleveland, two new departments have been created, the department of preventive medicine and public health and the department of bacteriology. Dr. James A. Doull, as head of the new department of preventive medicine and public health, will fill the newly created Elizabeth Severance Prentiss chair in preventive medicine. The department will be financed by an annual income from the Elizabeth Severance Prentiss Fund. An announcement from Western Reserve University states that the details of the organization of the department of bacteriology and the appointment of a director will be announced later. The department of hygiene and bacteriology at Western Reserve was established in 1910 as an offshoot of the department of pathology.

SOUTH CAROLINA

Personal.—Dr. Joseph I. Waring, Charleston, has been appointed by Governor Ransome J. Williams as a member of the state board of health to succeed Dr. Kenneth M. Lynch, Charleston, it is reported.

Dr. Rhame Resigns as Professor of Surgery.—Dr. Joseph Sumter Rhame has resigned as clinical professor of surgery at the Medical College of the State of South Carolina, Charleston. Dr. Rhame has been associated with the school since 1910.

License Revoked.—The South Carolina State Board of Medical Examiners reported on May 21 that the license to practice medicine or Dr. Perry M. Workman, Lyman, was revoked as of April 17 for violation of his probation on a narcotic charge.

Health Department Celebrates Twenty-Fifth Anniversary.—The Charleston County Health Department observed its twenty-fifth anniversary recently. Dr. Leon Banov, health officer, has held the position since the department was organ-

ized. In 1926 the county and city health departments were merged and ten years later the city department was abolished, giving the county group charge of health for both the city and the county of Charleston.

Society Incorporates—Creates New Foundation.—The Greenville County Medical Society at its meeting in June voted to incorporate. The society also authorized the establishment of a trust fund to be known as the Medical Foundation. Proceeds from the fund will be used for "scientific, educational and charitable purposes, including the promotion of the science of medicine, assisting medical students, the establishment of a medical library and the construction of a building for such purpose or purposes."

WASHINGTON

Emil Palmquist Named Health Commissioner of Seattle.—Dr. Emil E. Palmquist, health officer of King County, was on July 1 appointed commissioner of health for the city of Seattle. Dr. Ragnar T. Westman has been acting city health commissioner on leave from the U. S. Public Health Service.

Physicians Denied Injunction in Medical Society Suit.—On June 15 a temporary injunction by which they sought authority to practice in the Renton Hospital until trial of their court action was denied Drs. John M. Howell and Roy H. Blender, Renton. Superior Judge Robert M. Jones refused to grant the temporary restraining order to prevent the physicians from being barred from practice in the hospital, and their attorney, Gerald De Garmo, is reported to have said that the judge's denial will be used as the basis for a motion for an advanced setting of the case on the superior court calendar, according to the Seattle *Times*. The case was reported in THE JOURNAL, July 7, page 743, and involves a suit against the King County Medical Society and the King County Medical Service Corporation, both of which have been accused by the physicians of conspiring to acquire a "monopoly" for members of the society in practicing medicine in the county and to "eliminate competition" in furnishing medical and hospital services to the public on the prepayment or monthly payment plan.

WEST VIRGINIA

Library of Public Health Education.—For the first time in the history of the West Virginia State Health Department a reference and lending library has been established in the bureau of public health education in line with similar action taken by the health departments of many other states. For the present the library will be maintained for the use of the personnel of the state health department, but eventually it is planned to make the facilities available to the physicians in West Virginia.

Changes in Division Heads of Health Department.—Dr. Glenn A. Carmichael, Butte, Mont., has been appointed director of the division of maternal and child hygiene of the West Virginia State Department of Health, succeeding Dr. Lenore V. L. Patrick-Chipman, who resigned some months ago to engage in private practice at Williamstown, Ky. (THE JOURNAL, June 24, 1944, p. 589). Dr. Norman G. Angstadt, director of county health work, has been acting director of the division (THE JOURNAL, Oct. 7, 1944, p. 378) since Dr. Chipman resigned.—Dr. Robert L. Smith, U. S. Public Health Service, has been appointed acting director of the bureau of tuberculosis to succeed Dr. James T. Duncan, resigned. Dr. Smith, who has been assistant director of the bureau since April, was connected with the division of tuberculosis control of the United States Public Health Service, Bethesda, Md., for two years before coming to West Virginia. He recently completed a course in the school of public health at the University of Michigan. Several divisions and bureaus of the state health department have moved to downtown Charleston to provide space for expanding agencies left at the capitol. Twelve rooms have been rented in the Virginia Land Bank Building at the corner of Capitol and the Boulevard to house the bureau of venereal diseases, division of communicable diseases, bureau of industrial hygiene, division of maternal and child hygiene, the nutrition consultant and the midwife consultant. The division of industrial hygiene remains at 1584 East Washington Street, while the bureau of tuberculosis has been moved to 1719 Washington Street. The division of public health education is now located at 300½ Duffy Street, having been moved from the capitol to provide more room for the division of vital statistics, the bureau of county health work and the division of finance.

GENERAL

Leslie Dana Gold Medal Goes to William Zentmayer.—The Leslie Dana Gold Medal will be presented this year to Dr. William Zentmayer, professor emeritus of diseases of the eye, University of Pennsylvania Graduate School of Medicine, Philadelphia. The medal is awarded on the recommendation of the Association for Research in Ophthalmology and given to the recipient by the St. Louis Society for the Blind. Dr. Zentmayer has, among other positions, served as president of the American Ophthalmological Society and chairman of the Section on Ophthalmology of the American Medical Association. Conditions of the gold medal award set forth that it is to be made for "long meritorious service in the conservation of vision; in the prevention and cure of diseases dangerous to eyesight; research and instruction in ophthalmology and allied subjects; social service for the control of eye diseases, and special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision."

Red Cross Chapters to Recruit Blood Donors for Civilians.—American Red Cross chapters throughout the nation will be permitted to recruit blood donors for civilians under a program announced by Mr. Basil O'Connor, chairman of the American Red Cross. Under this project any Red Cross chapter may take part in the operation of a donor center for civilians sponsored by a recognized medical or health agency. The blood collected and the blood derivatives produced will be made available without cost to physicians, hospitals, clinics and patients. This civilian program is entirely separate from the Blood Donor Service operated by the American Red Cross for the armed forces, it was stated, and chapters in the eleven metropolitan centers where the Red Cross is now recruiting donors for the Army and Navy will not participate in it. These are Los Angeles, San Francisco, Oakland, Portland, Ore., San Diego, Chicago, New York, Brooklyn, Boston, Philadelphia and Washington. Assistance in establishing standards and conducting a civilian program will be made available to chapters through the five Red Cross area offices. The new project will be supervised by an advisory committee of specialists to be appointed.

Prevalence of Poliomyelitis.—Reports of cases of poliomyelitis for the week ended July 14 have been received from the division of public health methods, U. S. Public Health service, as follows:

Maine	1	South Carolina	11
New Hampshire	..	Georgia	8
Vermont	1	Florida	1
Massachusetts	2	Kentucky	..
Rhode Island	..	Tennessee	27
Connecticut	4	Alabama	6
New York	29	Mississippi	2
New Jersey	23	Arkansas	3
Pennsylvania	4	Louisiana	1
Ohio	10	Oklahoma	7
Indiana	1	Texas	45
Illinois	4	Montana	..
Michigan	1	Idaho	1
Wisconsin	1	Wyoming	1
Minnesota	..	Colorado	1
Iowa	1	New Mexico	..
Missouri	1	Arizona	..
North Dakota	..	Utah	..
South Dakota	..	Nevada	0
Nebraska	..	Washington	5
Kansas	5	Oregon	2
Delaware	1	California	22
Maryland	3		
District of Columbia	6	Total	253
Virginia	7	1944	462
West Virginia	3	Total to date	1,677
North Carolina	2	Same period 1944	1,752

Italian Medical Nutrition Mission.—Dr. James E. Perkins, director of the division of communicable diseases, New York State Department of Health, Albany, began a leave of absence June 15 to go to Italy to serve on the Italian Medical Nutrition Mission, which is studying health problems that have developed in the country following the war and is aiding in the establishment of a program for their control. Dr. Perkins has been commissioned as a reserve officer for the purpose by the U. S. Public Health Service and assigned to the United Nations Relief and Rehabilitation Administration, under which the mission is operating. Dr. Perkins plans to be in Italy for three months as co-epidemiologist of the mission to continue activities which have been conducted over a similar period by Dr. Ernest L. Stebbins, health commissioner of New York City, who accompanied the first contingent which left in April and should be back in July. The co-directors of the mission are Drs. Elmer L. Sevringhaus, Madison, Wis., and Maurice B. Visscher, Minneapolis. *Health News* of the New York State Department of Health reports that the work of the mission is being financed in part by two church organizations,

the Unitarian Service Committee and the Congregational Christian Service Committee. These agencies are furnishing much of the equipment and supplies and paying the salaries of many members of the mission.

Availability of Film.—The American College of Radiology announces that the production schedules in film allotments for the third quarter of the present year indicate that quotas for civilian physicians and hospitals have been appreciably increased. WPB allotments for civilian consumption of medical radiographic film during the last quarter of 1944 amounted to 9.2 million square feet. Owing to the fact that manufacturers were unable to meet these schedules, only 9 million square feet was actually shipped. In the first quarter of 1945, 9.7 million square feet was allotted for civilian consumption. Total shipments were 9.2 million square feet. Shipments for the second quarter of 1945 are not yet known, but it is undoubtedly somewhat less than the 9.4 million square feet allotted. For the third quarter of 1945, 10.6 million square feet has been allotted for civilian health services. If manufacturers are able to meet these schedules, radiologists should be able to obtain almost all the film they require, assuming that they effect all possible economies. The college estimates that 11 million square feet per quarter would meet minimum requirements of civilian physicians and hospitals. The allotment for the Army and Navy for the third quarter is not definitely known. For the army industrial program, 5 million square feet has been allotted for ordnance inspection. UNRRA will receive 500,000 square feet. The quota for FEA and Lend-Lease has been sharply reduced. It is estimated that about 24 million square feet of medical radiographic film will be produced during the third quarter. Radiologists who are unable to obtain sufficient film to maintain their services should continue to report their cases to the headquarters office of the college, 20 North Wacker Drive, Chicago 6. All such cases will be referred to the proper officials of the WPB.

Sugar Research Foundation Allots Grants.—More than $50,000 will be available for seven universities and laboratories by the Sugar Research Foundation, New York, according to an announcement July 16. The studies to be pursued under the new grants will seek new industrial uses of sugar and further explore the nutritional values of sugar. Eight of the projects call for allotments totaling $41,500. Specific use of the grants includes:

Dr. Hans Selye, associate professor of histology, McGill University Faculty of Medicine, Montreal, $10,000 for a three year study of the effects of diets in protecting animals from the effects of overactivity of the endocrine glands.

Dr. Israel M. Rabinowitch, associate professor of medicine at McGill, $10,000 for investigation of the use of sugars in human nutrition in health and in disease.

Gebhard Stegeman, Ph.D., professor of physical chemistry at the University of Pittsburgh, $7,000 to collate all existing data and carry out new measurements of the physical properties of sugar and sugar solutions for use by industrial chemists.

Frederick W. Zerban, Ph.D., and Louis Sattler, Ph.D., New York Sugar Trade Laboratory, New York, $4,000 for further investigation of the unfermentable constituents of molasses.

George R. Cowgill, Ph.D., professor of nutrition, Yale University School of Medicine, New Haven, $3,600 to survey the vitamin content of various products of the sugar industry at the point where they reach the market.

Leo T. Samuels, Ph.D., head of the biochemistry department at the University of Utah, Salt Lake City, $3,500 to study the capacity of animals to adjust themselves physiologically to various types of diets.

Heinz M. Wuest, Ph.D., Brooklyn Polytechnic Institute, $1,900 to study preparation of several compounds closely related to vitamin B_1 and study their effects on assay methods.

Walter D. Bonner, Ph.D., and Ralph F. Phillips, Ph.D., of the chemistry department at the University of Utah, $1,500 to study production of certain glucose derivatives directly from sugar and molasses.

Dr. Luther Emmett Holt Jr., New York, an additional $5,000 to continue his work on the synthesis of vitamins in the intestinal tract under the influence of various diets.

James M. Neill, Ph.D., professor of bacteriology and immunology, Cornell University Medical School, New York, renewal of a $4,500 grant.

LATIN AMERICA

Health Activities in Latin America.—*Maternal and Child Health Services in Rural Districts.*—The first of a proposed series of maternal and child health stations in the rural districts of Peru recently began to function in the town of Tingo Maria. The staff of the station consists of a graduate child health worker, a midwife and two assistants. Their work is chiefly educational, and most of it is done through visits to the homes of the rural workers. The child health worker and the midwife instruct the women in antepartum and infant care, in general hygiene and in ways of improving their families' living conditions.

Course on Phthisiology.—The first Argentine Congress on Phthisiology will be held in Buenos Aires in November, the exact dates to be determined later. The congress is to be sponsored by the Sociedad Argentina de Tisiologia with the cooperation of the National Department of Public Health against tuberculosis and of the societies against tuberculosis in the various provinces and hospitals of Argentina. Headquarters of the congress are located at Avenida Velez Sarsfield 405, Buenos Aires.

Health Center Named for General Dunham.—On April 6 the Health Center General Dunham was dedicated, according to the *Newsletter* of the Health and Sanitation Division of the Institute of Inter-American Affairs. The center was constructed by the Servicio Cooperativo Inter-Americano de Salud Publica in Asuncion, Paraguay, and named in honor of Gen. George C. Dunham, M. C., president of the Institute of Inter-American Affairs. General Dunham spoke at the dedication ceremonies.

School of Hygiene Dedicated.—The School of Hygiene, Santiago, Chile, organized in 1944 through the cooperative efforts of the University of Chile, the Rockefeller Foundation, the Bacteriological Institute and the U. S. Public Health Service, was opened May 11, according to the *Newsletter* of the Health and Sanitation Division of the Institute of Inter-American Affairs. The school was equipped and constructed by the Departamento Cooperativo Interamericano de Obras de Salubridad at a cost of $85,000. It will offer undergraduate and postgraduate courses leading to a degree of master of public health. Speakers at the opening included Dr. Theodore I. Gandy, chief of field party in Chile and head of the Departamento Cooperativo Interamericano de Obras de Salubridad; Nacianceno Romero, director of health; Eugenio Suarez, director of the Bacteriological Institute; Lewis W. Hackett, director of the Rockefeller Foundation for Rio de la Plata and the Andean region; Armando Larraguibel, dean of the school of medicine, University of Chile, and Hernan Romero, director of the school of hygiene.

Meeting of Academy of Surgery.—Three American physicians were among the eight new members accepted into the Mexican Academy of Surgery at a ceremony held on June 12 in the auditorium of the National University Faculty of Medicine, Mexico City, in celebration of the twentieth anniversary of the founding of the society. The Americans, who were titled as foreign correspondents of the academy, are Drs. Julius L. Spivack, Chicago, Chevalier L. Jackson, Philadelphia, and Paul H. Holinger, Chicago. The new Mexican members are Drs. Fernando Valdes Villareal, Donato Ramirez, Ignacio Cadena, Manuel Medina Gutierrez and Inocencio de Lara. Dr. Jose Torres Torija, permanent secretary of the organization, delivered the speech of welcome to the initiates.

Penicillin Distribution Changed.—Mexican patients are now able to obtain penicillin at any drugstore on their physician's prescription under a decision of the Mexican government to free the drug from all bureaucratic control. Up to now the supply has been controlled by the federal ministry of public health and public welfare and a committee of three physicians who were entrusted with its distribution to the profession. Since the quantity on hand is believed to be more than enough to satisfy the country's demand, the government has ordered it made available to the general public under medical supervision. A top retail price has also been fixed at 11.50 pesos (approximately $2.30) per hundred thousand units. Private practitioners are given a special price of 5 pesos per hundred thousand units of penicillin for office use, effective on July 1.

Health Films for Institute of Inter-American Affairs.—A series of ten animated health films entitled "Salud para las Americas" (Health for the Americas) has been produced by the Walt Disney Studios for the Institute of Inter-American Affairs. The first eight of these films were released during May and June and the last two will be released during September. The titles are "The Human Body," "What is Disease," "Tuberculosis," "Infant Care," "How Disease Travels," "Cleanliness Brings Health," "Hookworm," "Insects as Carriers of Disease," "Environmental Sanitation" and "Nutrition." Although contributions from many sources have gone into the final production, these ten animated films are primarily the work of Capt. Ryland R. Madison, S. C., and Dr. Janet W. Mackie of the institute and Mr. Ben Sharpsteen of Walt Disney Productions.

CORRECTION

Military Rank Omitted.—The military rank of Dr. Ronald L. Denton should have been included at the end of the communication to the editor on "Treatment of Erythroblastosis Fetalis" in THE JOURNAL, June 30, page 686, as follows: Surgeon Lieutenant Commander Ronald L. Denton, R. C. N. V. R.

Foreign Letters

LONDON

(From Our Regular Correspondent)

June 30, 1945.

The Future of Psychiatry

The Royal College of Physicians, the British Medical Association and the Royal Medico-Psychological Association during the past year have been formulating their views on the future of psychiatry. As these views are so similar, it was decided to publish them in a joint memorandum. This points out that in recent years psychiatry has been brought into increasingly close relation with general medicine. Historically psychiatry developed as the method of treatment of those whose mental illness necessitated segregation. It is now recognized that this distinction, however important socially, is medically irrelevant, for there is only a difference of degree between the majority of the patients in a mental hospital and the far more numerous sufferers from less severe mental disorders outside. The proportion of the general population requiring treatment in mental hospitals is 3.9 per thousand. But much more psychiatry needs to be done outside than inside these hospitals. At the same time psychiatry has shown that it has much to contribute to research into the causes and treatment of many forms of illness formerly regarded exclusively from the medical or surgical point of view.

The following recommendations are made: 1. Psychiatry is not a limited specialty. It permeates and influences general medicine, surgery, obstetrics and gynecology. Psychiatrists should be appointed to the staffs of general hospitals with status equal to that of other physicians and surgeons. 2. The mental health department of the health service of the future should be responsible for the organization of all medical work which is essentially psychiatric. 3. The psychiatrist is not concerned merely with fully developed mental disorders. The mental health service should include provision for prophylaxis of mental disorders over the widest field. 4. In the educational sphere psychiatric advice is essential for children showing neurosis, behavior disorder or mental defect. 5. In industry a full and efficient consultative psychiatric service should be available, which should work in close cooperation with the patient's doctor and the industrial medical officer. Psychiatrists should cooperate with industrial psychologists in the investigation of industrial fatigue and ill health, working hours and conditions, incentives, personnel management and the like. 6. Psychiatrists should cooperate in the work of vocational guidance and selection, an essential part of which is the assessment of personality and temperament. 7. Psychiatrists should take part in the rehabilitation of patients after accident or illness. This work should be carried out in close liaison with employers, workers' representatives and patients' doctors.

The Control of Science in Germany

In the House of Lords during a discussion on the prevention of scientific developments in Germany for the purpose of war Lord Vansittart said that unless this was done even more potent secret weapons would be produced. Provision should therefore be made to guard against granting permission to develop devices potentially dangerous. He advocated control of all German laboratories, university and industrial, through an intelligence service of the united nations. Lord Brabazon was more specific and discussed particularly the "directed missile" in the form of the flying and rocket bomb. He therefore suggested, as part of the peace organization, an international inspectorate with power to enter works anywhere in the world.

Lord Cherwell replied for the government. He said that a scientific committee had been appointed a year ago to consider the whole question of scientific research in Germany, and a preliminary report would soon be ready. Any proposals must be discussed with our allies. A scientific and technical staff had been attached to the headquarters of the Allied Expeditionary Forces to examine and control German activity in these fields.

The Increased Birth Rate

In surveying retrospectively the national health during five and a half years of war, Minister of Health Willink reported in the House of Commons that the birth rate had been rising since 1941 and last year was the highest since 1925 and within 1 per cent of full replacement. Not only had more babies been born but fewer had died. The chance of a baby being born dead was only three fourths of what it was six years ago, he said. Also fewer mothers were being lost in childbirth. All the vital statistics for mothers and children were the best this country had ever known.

THE NETHERLANDS

(From Our Regular Correspondent)

May 10, 1945.

Five Years of Enemy Occupation

Five years have passed since the invasion. Before the war the physicians were organized in the Maatschappy tot Bevordering der Geneeskunst (Society for the Advancement of Medicine). Very gradually the Germans tried to nazify the organization, with the result that 95 per cent of all the physicians joined the secret organization known as M. C. (Medical Contact). The central committee of this underground organization gave its directives in the closest contact with other underground organizations, the churches and so on, and in this way it became possible that, for instance, at the same hour in the whole country all the physicians removed the signs at their doorsteps in protest to the German attempt to incorporate them in the nazi "artsenkamer." The result was that the Germans failed completely in their attempts in all respects. The membership of M. C. and the other underground activities caused a great many deaths among us. Many had to "dive," as we called it, and this, combined with the closing of the universities since 1942, caused a considerable decrease in the number of physicians.

A great handicap was the loss of contact with the outside world. Only German medical literature was available, and so it happened that for many of us the first report of the existence of penicillin arrived by means of the British Broadcasting Company and pamphlets dropped by the Royal Air Force. The future, however, will give proof of the scientific activities of our medical community. In the field of intravenous therapy, in the treatment of fractures, in chest surgery, in the treatment of uremia, an x-ray device for a very exact localization of metal foreign bodies was either developed or adopted.

No official records are yet known as to the state of health of the population. Many data about deaths, births and domiciles were often deliberately falsified or destroyed. Public administration became chaotic, and it therefore becomes clear that, e. g. in the Hague, the number of fatal bombardment casualties is still a guess. It will take quite a long time before we can get at the exact data about the medical situation. Generally speaking there was an increase in tuberculosis and infectious diseases (especially diphtheria and scarlet fever). The increase in venereal diseases was evident despite the fact that only a limited number of women was involved. A strict control by the state hygienic authorities isolated a few cases of typhus and typhoid and protected the population effectively. Allied and enemy air action caused a great many casualties. The death rate of the newborn and young children increased also.

Our hospitals and sanatoriums did what they could, but they were greatly handicapped by the lack of personnel, equipment,

drugs, dressing material and instruments. At the outbreak of war we had a large store of food, drugs—for instance, insulin—but they were used for the Germans. Only the urgent cases could get hospital treatment. Temporary hospitals were erected for chronic patients. During 1944 and 1945 the food supply decreased sharply, with the result that especially in the large cities like Amsterdam, Rotterdam and the Hague the population starved. In the city of Amsterdam (750,000 inhabitants) a conservative estimate gives a mortality to the present of 10,000.

BOLIVIA

(From Our Regular Correspondent)

LA PAZ, July 6, 1945.

Hospital Facilities in Bolivia

Figures regarding hospital facilities in Bolivia recently were made available, the first since 1942. The present figures are based on those collected by the Vital Statistics Department of the Bolivian Health Ministry under the direction of Mr. Hubert E. Navarro, to be presented to this year's congress.

Under government control there are now operating thirty-six hospitals with a combined bed capacity of 3,347, against thirty-five such hospitals with a capacity of 3,236 beds in 1942. This means there are at present 1.12 beds available for every thousand inhabitants. The individual capacity of these hospitals varies between 550 beds, as in the La Paz General Hospital, and 5 beds. There are thirty-one general hospitals with a combined capacity of 2,779 beds, one hospital for the treatment of mentally ill with 236 beds, one children's hospital with 80 beds, two hospitals for cases of tuberculosis with a total of 210 beds, and an eye hospital with 33 beds.

There is a total of twenty privately owned hospitals with a combined capacity of 601 beds, representing 15.2 per cent of the total beds available. Of this number nine clinics are operated on a proprietary basis; one, caring especially for poor children and operating a free delivery service, is operated by a nonprofit organization.

No figures on admission rate, length of stay or similar statistics are available, or on the number of registered nurses, orderlies, laboratory technicians and other hospital personnel. The occupancy rate is probably rather high because of the relatively few hospital facilities, the public hospitals being therefore constantly fully occupied.

There are three schools for nursing education, two of them operating attached to public hospitals and one in connection with a private clinic, with a combined student enrolment of about 120 girls.

The general director of health, Dr. Debbe, is developing a program of new hospital facilities, including a leprosarium and expanding existing services. Some of these projects are helped through the coordinator's health program. There is a special project for starting free delivery stations all over the country.

Number of Physicians and Other Health Officers in Bolivia

Published by the Bolivian Health Ministry were figures concerning physicians, pharmacists and other health officers at work during the month of October 1944. An average of 1.48 physicians is available to take care of 10,000 inhabitants, an average of 6,810 inhabitants being attended by every registered doctor. There are large parts of the population distributed in such a manner over wide parts of the national territory that it would be difficult if not impossible to offer them any medical attention at all; this is especially true regarding the tropical regions of Beni and Pando, situated on the Brazilian border and covered mostly by bush, where the density of population is less than 1 per square kilometer, and the only ways of communication are the rivers and the airlines.

The total number of physicians and other registered health officers has greatly improved since 1942, when a similar survey was made. The number of physicians has increased from 471 in 1942 to 528 in 1944. Not included are the physicians, enrolled with the Bolivian armed forces, who attend civilians in places where no other physician is yet established. The health authorities also allowed some refugee physicians to work in places where no other licensed physician is available, locating them mostly in the tropical regions. Some help in public health work is also offered by institutions such as the Coordinator's Health Division, which is at present employing 2 to 3 doctors and some nurses right in the bush regions, as well as the Rockefeller Foundation, which for years, under the direction of Dr. Henry P. Carr has performed a most important sanitation work through its yellow fever, malaria and uncinariasis services.

Visitors to the United States

Dr. Guillermo Debbe, Bolivian surgeon and general director of health of the country, is going to visit the United States soon, following an invitation made by the coordinator's office. On his trip, planned also by the coordinator, Dr. Debbe will see especially establishments concerning preventive medicine, and he will be most interested in studying the details of organizing public health institutions and health authorities. He has been organizing in this country the existing public emergency service and the health department. On his way back he will also visit Mexico, Cuba, Venezuela and Peru.

Dr. Carlos Ferrufino, who has been general inspector of health in Bolivia, is to join the UNRRA displaced persons program. Dr. Ferrufino only recently returned from the United States, where he finished postgraduate studies on a scholarship at Harvard. He will leave soon for Washington, D. C., on his way to Europe.

Marriages

WILLIAM MERRILL CORRY WILHOIT, Quincy, Fla., to Miss Martha Elizabeth Watkins of Valdese, N. C., in Durham, N. C., June 23.

PHILIP VINCENT DAUGHERTY, Nashville, Tenn., to Miss Rosemary Rita Levitt of Villa Ridge, Ill., in St. Louis, June 4.

HIRAM BARRINGER VAN DEUSEN, Canandaigua, N. Y., to Miss Muriel Ehrich of Newark, N. J., recently.

RAMSAY GARRISON LATIMER, West Columbia, S. C., to Miss Jean Neuman Mehrtens of Charleston, June 16.

WELLINGTON B. STEWART, Evanston, Ill., to Miss Helen M. Zimmerman of Spencerport, N. Y., June 16.

JULIAN MULDROW DURANT, Alcolu, S. C., to Miss Marie Elizabeth Beckett of Beaufort, June 19.

LEEWAN ROBERT KELLAM, Culver, Ind., to Miss Emily Taylor Richardson of Raleigh, N. C., June 16.

BEVERLY C. CHATHAM, Greenville, Ky., to Miss Janet Johnson of Nashville, Tenn., June 20.

LEWIS GEORGE RICHARDS JR., Roanoke, Va., to Miss Dorothy Nelle Quinn of Lynchburg, June 23.

CHARLES A. DWYER JR., Houston, Texas, to Miss Virginia Dean of Hollywood, Calif., April 21.

THOMAS E. WYATT JR., Marshfield, Wis., to Miss Pauline M. Ciola in Fort Pierce, Fla., June 18.

HARVEY RAY ST. CLAIR to Miss Pauline Carroll Keller, both of Staunton, Va., June 23.

WILLIAM L. CHEEZEM JR., Andrews, S. C., to Miss Louise McBrayer of Columbia, June 9.

ROBERT LESLIE CRAIG, Honolulu, Hawaii, to Miss Rita Beryl Knight in Akron, Ohio, June 16.

PALUEL J. FLAGG, Yonkers, N. Y., to Miss Marcella V. Devlin in Harrison, June 27.

ALBERT STEPHAN TERZIAN to Miss Ellen Ruth Skilton, both of Philadelphia, June 15.

JACK DENIS FLYNN to Miss Stella Rosalie Valenti, both of Tampa, Fla., June 20.

Deaths

Alexander H. Beam, Cincinnati; Medical College of Ohio, Cincinnati, 1890; for many years associated with the Warren E. Richards Company, realtors, as sales manager and director; died May 7, aged 83, of carcinoma of the sigmoid and the descending colon.

Seth Douglas Beavers ✠ Decatur, Ind.; Rush Medical College, Chicago, 1886; honorary member of the Indiana State Medical Association; died May 12, aged 84, of congestive heart disease and chronic myocarditis.

Julian Lee Birdsong, Hartford, Conn.; Johns Hopkins University School of Medicine, Baltimore, 1909; died in the Veterans Home, Rocky Hill, May 17, aged 69, of coronary occlusion.

Vernon Blythe, Paducah, Ky.; University and Bellevue Hospital Medical College, New York, 1900; member of the American Medical Association; served as a member of the state board of health; past president of the Southwestern Kentucky Medical Association; at one time secretary of the McCracken County Medical Society; served during World War I; formerly chairman of the municipal housing commission and past president of the board of education; died in the Illinois Central Hospital May 3, aged 68, of lobar pneumonia.

Nathan Leander Bourne ✠ Decatur, Ill.; Barnes Medical College, St. Louis, 1903; served on the staffs of the Decatur and Macon County Hospital and St. Mary's Hospital; died May 17, aged 71, of circulatory failure.

Lemuel Brehaut, White Plains, N. Y.; University of the City of New York Medical Department, New York, 1887; died June 13, aged 83, of generalized arteriosclerosis.

Cecil Else Brous ✠ Portland, Ore.; University of Oregon Medical School, Portland, 1913; died June 3, aged 55, of nephritis.

Charles Roscoe Buren, Princeton, Mo.; St. Louis College of Physicians and Surgeons, 1896; served during World War I; major, medical reserve corps, U. S. Army, not on active duty; at one time associated with the Indian Service; died in Atlanta, Ga., June 8, aged 71, of coronary occlusion.

Roscoe Patrick Carney, Davenport, Iowa; St. Louis College of Physicians and Surgeons, 1911; served as president and secretary of the Scott County Medical Society; member of the American Medical Association, Iowa Sanatorium Association, American College of Chest Physicians and the American Trudeau Society; served as president of the alumni association of St. Ambrose College; for many years medical director of the Pine Knoll Sanatorium; on the staffs of the Mercy and St. Luke's hospitals; died in Firman Desloge Hospital, St. Louis, June 12, aged 60, of progressive pulmonary fibrosis, heart disease and terminal pneumonia.

Walter Scott Conn, Los Angeles; Chicago College of Medicine and Surgery, 1914; served during World War I; formerly associated with the U. S. Public Health Service Reserve; died May 10, aged 78, of heart disease.

George D. Counts ✠ Wesley, Ark.; Marion-Sims College of Medicine, St. Louis, 1897; secretary of the Madison County Medical Society; on the staff of the Fayetteville City Hospital, Fayetteville; died April 18, aged 73, of carcinoma.

George L. G. Cramer, Owosso, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1889; member of the American Medical Association; for many years county coroner; past president of the Shiawassee County Medical Society; past president of the Shiawassee County Conservation Association; instrumental in the founding and for many years active on the staff of the Memorial Hospital, serving for two years as chief of the staff; died April 3, aged 80.

Ernest Charles Dalton, St. Helens, Ore.; Willamette University Medical Department, Salem, 1905; formerly a contract surgeon in the U. S. Army; served on the Mexican border in 1916 and during World War I; died in St. Helens General Hospital May 16, aged 72, of cardiovascular disease.

John L. Daniels, Jefferson, Wis.; Milwaukee Medical College, 1905; for many years city physician; died May 16, aged 64, of arteriosclerosis and diabetes mellitus.

Willis Irving Dillingham, West New York, N. J.; Dearborn Medical College, Chicago, 1906; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1907; local school physician; died in Secaucus May 21, aged 76, of nephritis and arteriosclerosis.

George H. Ellis, Oilton, Okla.; Memphis (Tenn.) Hospital Medical College, 1903; served a term as mayor of Oilton; died in Stillwater, March 31, aged 73, of cardiac failure and carcinoma of the leg.

Alfred Eugene Ewing, McDonald, Ohio; Cleveland Medical College, 1896; member of the American Medical Association; surgeon for Carnegie-Illinois Steel Corporation; past president of the local school board; served as director of the Federal Bank and First National Bank in Girard; died May 23, aged 75, of coronary disease.

John Bartow Fattic, Anderson, Ind.; Medical College of Ohio, Cincinnati, 1884; member of the American Medical Association; directed the organization of a hospital unit during World War I, serving overseas as a major; later promoted to lieutenant colonel; for many years chief surgeon for the Indiana Union Traction Company, examiner for many insurance companies and member of the staff of St. John's Hospital, where he died May 10, aged 82, of cerebral hemorrhage.

John Vernon Ferrell, Eldorado, Ill.; Chicago College of Medicine and Surgery, 1917; member of the American Medical Association; served as president of the Saline County Medical Society; member and past president of the Eldorado Rotary Club; medical director and part owner of the Eldorado Hospital; died May 8, aged 55, of carcinoma of the liver.

Maynard A. Finley ✠ Emporia, Kan.; St. Louis College of Physicians and Surgeons, 1897; died April 26, aged 75, of chronic nephritis.

Harvey John Flowers ✠ Kilmichael, Miss.; Memphis (Tenn.) Hospital Medical College, 1897; died in West Point March 25, aged 73.

Ellen Bellows Foot, New Rochelle, N. Y.; Cornell University Medical College, New York, 1938; member of the American Medical Association; diplomate of the National Board of Medical Examiners; assistant professor of surgery (anesthesia) at her alma mater; served a residency at the Massachusetts General Hospital in Boston and the Presbyterian Hospital in New York; interned at the New York Hospital, New York, where she served as anesthetist in chief and where she died May 11, aged 32, of primary carcinoma of the liver.

Rodolphus Wickham Fuller ✠ Grand Rapids, Mich.; Detroit College of Medicine, 1909; served as head physician at the Indiana State Reformatory Hospital, Pendleton, and on the staff at St. John's Hospital in Anderson; on the staffs of Blodgett Memorial and St. Mary's hospitals; died in the Butterworth Hospital April 29, aged 58, of coronary occlusion.

Adolph Otto Goldstein ✠ Philadelphia; Medico-Chirurgical College of Philadelphia, 1906; associate in laryngology at the Medico-Chirurgical College, Graduate School of Medicine, University of Pennsylvania; on the staffs of the Northern Liberties and St. Luke's hospitals; died in the Doctors Hospital May 19, aged 63, of coronary thrombosis.

Thurman Bishop Haas, McArthur, Ohio; Jefferson Medical College of Philadelphia, 1913; served overseas as a major in the medical corps of the U. S. Army during World War I; died March 15, aged 58.

Edward Eli Heiple, St. Louis; St. Louis University School of Medicine, 1914; member of the American Medical Association; on the staffs of the Alexian Brothers' and St. Anthony's hospitals; died in Jefferson Barracks, Mo., May 4, aged 56, of hypertensive and arteriosclerotic heart disease.

Beverly A. Henry, Anderson, S. C.; Atlanta (Ga.) Medical College, 1886; honorary member of the South Carolina Medical Association; member of the American Medical Association; served as president of the city chamber of commerce; died in the Anderson County Hospital April 4, aged 82, of coronary thrombosis.

Samuel Beck Herdman, Taylorville, Ill.; Rush Medical College, Chicago, 1909; served during World War I; fellow of the American College of Surgeons; chief surgeon for the Peabody Coal Company; past president of the Christian County Medical Society; on the staff of St. Vincent's Hospital; died May 18, aged 63, of cerebral hemorrhage.

Henry Leon Hirsch ✠ Springfield, Mass.; Jefferson Medical College of Philadelphia, 1906; at one time member of the city school committee; served during World War I; died May 8, aged 60, of coronary thrombosis.

George Llewellyn Hoffman Sr., ✠ Norristown, Pa.; Jefferson Medical College of Philadelphia, 1904; past president of the Montgomery County Medical Society; on the staffs of the Montgomery and Sacred Heart hospitals; formerly on the staff of the Graduate Hospital of the University of Pennsylvania, Philadelphia; veteran of the Spanish-American War; died May 17, aged 77, of coronary thrombosis.

Arcturus Lee Howard, Chevy Chase, Md.; Georgetown University School of Medicine, Washington, D. C., 1893; retired in 1940 as head of the business practice department of the District of Columbia high schools; served on the staff of the Emergency Hospital and Central Dispensary in Washington, D. C.; died May 31, aged 75, of uremia, cerebral hemorrhage and cardiovascular-renal disease.

Boyd Merrill Krout, Stockton, Calif.; Harvard Medical School, Boston, 1913; member of the American Medical Association; served overseas during World War I; formerly on the staff of the San Joaquin General Hospital in French Camp; assistant health officer of the San Joaquin health district, with which he had been connected since 1927; died May 4, aged 60.

Oscar Adair Lashley, Steubenville, Ohio; Ohio State University College of Medicine, Columbus, 1924; member of the Student Army Training Corps during World War I; secretary of the Jefferson County Medical Society, 1927-1928, and president in 1929; died March 20, aged 46.

George Emerson Learn, Hamburg, N. Y.; University of Buffalo School of Medicine, 1904; member of the American Medical Association; retired member of the Medical Society of the State of New York; at one time served as principal of Stevensville, Ont., schools; formerly health officer of Hamburg; died in Our Lady of Victory Hospital, Lackawanna, May 27, aged 73, of heart disease.

Ada Belle Blair Mackey, Altoona, Pa.; University of Pittsburgh School of Medicine, 1909; died in the Altoona Hospital April 15, aged 60, of carcinoma of the uterus.

Maximilian Malina, Chicago; Chicago College of Medicine and Surgery, 1911; on the staffs of the Walther Memorial and Norwegian American hospitals; died May 23, aged 63, of coronary insufficiency and chronic myocarditis.

Frank Lynn McCready ⊕ Sewickley, Pa.; University and Bellevue Hospital Medical College, New York, 1899; past president of the board of health of Sewickley; commissioned in the medical section of aerial photography, with rank of captain, during World War I; on the staff of the Sewickley Valley Hospital; died May 16, aged 71, of pneumonia.

Marvin Alford McDowell ⊕ Logansport, Ind.; Indiana University School of Medicine, Indianapolis, 1911; served during World War I; member of the American Psychiatric Association; on the staff of the Logansport State Hospital; died May 21, aged 66, of cerebral thrombosis.

Sherwin E. Mella ⊕ Kansas City, Mo.; University of Kansas School of Medicine, Kansas City, 1919; member of the American Academy of Dermatology and Syphilology; instructor in dermatology at the University of Kansas School of Medicine, Kansas City, Kan.; on the staffs of Menorah Hospital and St. Luke's Hospital, where he died May 18, aged 49, of coronary disease.

Henry Estes Merriam, Ithaca, N. Y.; New York Homeopathic Medical College and Hospital, New York, 1894; retired member of the Medical Society of the State of New York; member of the American Medical Association; past president of the Tompkins County Medical Society; served during World War I; died in the Clifton Springs (N. Y.) Sanitarium June 25, aged 76, of cerebral hemorrhage.

Samuel Gibbs Milliken, Houston, Texas; University of Texas School of Medicine, Galveston, 1922; formerly adjunct professor of pathology at his alma mater; interned at the Peter Bent Brigham Hospital in Boston; served overseas during World War I; died March 23, aged 49, of bilateral pulmonary tuberculosis and toxic myocarditis.

Ben Parmenter, Mount Carmel, Ill.; Barnes Medical College, St. Louis, 1909; died May 10, aged 63, of heart disease.

Wallace Bernard Phillips, Gary, W. Va.; John A. Creighton Medical College, Omaha, 1916; died May 20, aged 52, of acute dilatation of the heart.

Walter Jewett Pinkerton ⊕ Ramsay, Mich.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1900; formerly mayor of Bessemer; physician for the Castile Mining Company; served on the staff of the Grand View Hospital in Ironwood; died May 9, aged 72, of carcinoma of the stomach.

William James Pinkerton ⊕ Omaha; Omaha Medical College, 1898; served during World War I; died in the Clarkson Memorial Hospital, April 15, aged 74, of bronchopneumonia and carcinoma of the urinary bladder.

William Warren Quinton ⊕ Major, U. S. Army, retired, Santa Barbara, Calif.; Columbia University College of Physicians and Surgeons, New York, 1892; entered the army as a first lieutenant on Oct. 26, 1893 and retired with rank of major in 1909 for disability in line of duty; died in St. Francis Hospital July 18, 1943, aged 73, of coronary sclerosis and arterial hypertension.

Emanuel M. Radlow, Cold Spring, N. Y.; Albertus-Universität Medizinische Fakultät, Königsberg, Prussia, Germany, 1901; died April 14, aged 68, of cerebral hemorrhage and chronic arteriosclerosis.

Sol E. Ravitz, Chicago; University of Nebraska College of Medicine, Omaha, 1920; clinical associate in dermatology and syphilology and secretary of the department, Loyola University School of Medicine; a member of the out-patient department of the dispensary of the Mercy Hospital; died May 19, aged 48, of coronary thrombosis.

Dean Stelle Rising ⊕ Kansas City, Mo.; University Medical College of Kansas City, Mo., 1910; on the staffs of St. Vincent's Hospital and St. Joseph's Hospital, where he died May 12, aged 61, of coronary thrombosis.

Martin M. Ritter, Los Angeles; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1892; served as chief of staff and at one time vice president of the staff of the Columbus Hospital in Chicago; died June 12, aged 82, of myocarditis.

Abraham Rosenberg ⊕ New York; Columbia University College of Physicians and Surgeons, New York, 1905; died May 26, aged 63, of heart disease.

Albie Jens Rosholt, La Crosse, Wis.; Rush Medical College, Chicago, 1908; member of the American Medical Association; secretary of the La Crosse County Medical Society; served during World War I; at one time county physician; for many years on the staffs of the La Crosse and St. Francis hospitals; formerly on the staff of the La Crosse Lutheran Hospital; director and at one time president of the State Bank of Rosholt; died in Sparta May 16, aged 66, of coronary occlusion.

Edwin Ross, St. Helens, Ore.; University of Oregon Medical School, Portland, 1894; for many years city health officer; served as bank president; died March 29, aged 80.

William F. Schaare ⊕ Chicago; College of Medicine and Surgery (Physio-Medical), Chicago, 1902; veteran of the Spanish-American War; served as national president of the 7th Army Corps Veterans' Association; died in River Forest June 19, aged 69, of cerebral hemorrhage.

J. H. Alfred Schulz, Milwaukee; Wisconsin College of Physicians and Surgeons, Milwaukee, 1903; died May 11, aged 74, of myocardial degeneration.

Henry Franklin Slifer, North Wales, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1876; at one time president of the Montgomery County Medical Society; emeritus professor of physiology at the Temple University School of Medicine, Philadelphia; at one time professor of physiology at the North Wales Academy and the Medico-Chirurgical College of Philadelphia; for many years a member of the school board; died April 2, aged 92.

Edwin Kirby Smith, McMinnville, Tenn.; George Washington University School of Medicine, Washington, D. C., 1927; member of the Medical Society of the District of Columbia and the American Medical Association; interned at the Garfield Memorial Hospital and the Children's Hospital in Washington, D. C.; served a residency at the Children's Hospital in Cincinnati; died June 21, aged 46, of heart disease.

Caleb S. Stone Sr., Seattle; Louisville (Ky.) Medical College, 1883; member of the American Medical Association and the Idaho State Medical Association; died May 31, aged 88, of uremia.

Edwin Wilfred Stubbs, Aurora, Ill.; Marion-Sims College of Medicine, St. Louis, 1897; served as county physician; examining physician for the draft board during World War I; died in the Copley Hospital May 26, aged 81, of coronary occlusion and generalized arteriosclerosis.

Ross Adams Switzer, McHenry, Miss.; Chattanooga (Tenn.) Medical College, 1902; member of the board of supervisors of Stone County for twenty-eight years, serving as president of the board at the time of his death; died May 1, aged 69.

Toyohiko Campbell Takami ⊕ Brooklyn; Cornell University Medical College, New York, 1906; on the staffs of the Cumberland and Prospect Heights hospitals; member of the board of the Long Island Biological Association of Cold Spring Harbor; died May 17, aged 70, of pneumonia.

Thomas Franklin Taylor, Monteagle, Tenn.; Vanderbilt University School of Medicine, Nashville, 1897; member of the American Medical Association; secretary of the Grundy County Medical Society; died April 24, aged 75, of carcinoma of the liver.

Thomas G. Taylor, Leaksville, N. C.; Kentucky School of Medicine, Louisville, 1877; served as mayor of Leaksville; died in the Leaksville General Hospital April 17, aged 88, of cerebral hemorrhage.

Walter Leon Teaby, Monterey, Calif.; College of Physicians and Surgeons of San Francisco, 1903; member of the American Medical Association; formerly associated with the U. S. Public Health Service; served as city councilman and as mayor of Monterey; died May 1, aged 73.

Joseph Abbott Thissell, Tupper Lake, N. Y.; Harvard Medical School, Boston, 1885; an organizer of the Tupper Lake Water Company, serving as first treasurer and president of that firm; instrumental in organizing the Tupper Lake National Bank and served as one of its first directors; for many years surgeon for the New York Central Railroad; served as medical examiner for the New York Life, Mutual Life and Prudential Insurance companies; died in the Mercy General Hospital May 13, aged 86, of pneumonia.

William Thomas Thorn, Marked Tree, Ark. (licensed in Arkansas in 1903); member of the American Medical Association; died in the Baptist Hospital, Memphis, Tenn., May 1, aged 72, of heart disease.

Edward Vincent Tolan ✠ Pottsville, Pa.; Jefferson Medical College of Philadelphia, 1929; interned at Misericordia Hospital and served as resident physician at St. Christopher's Hospital for Children, both in Philadelphia; on the staffs of the Good Samaritan and Pottsville hospitals; died May 15, aged 40, of coronary occlusion.

Theodore Henry Trappe, New Athens, Ill.; St. Louis College of Physicians and Surgeons, 1910; member of the American Medical Association; died June 13, aged 66, of coronary disease.

Lloyd Herman Van Slyke, Black Earth, Wis.; Chicago College of Medicine and Surgery, 1916; served with a field hospital at Chateau Thierry, St. Mihiel and the Argonne in World War I; died in the Veterans Administration Facility, Wood, March 24, aged 53, of carcinoma.

William Conrad Wessel, Hermann, Mo.; Marion-Sims College of Medicine, St. Louis, 1899; served as local surgeon for the Missouri Pacific Railroad; died in State Hospital number 1, Fulton, April 11, aged 69, of cerebral hemorrhage.

William Kerr West ✠ Hinsdale, Ill.; Detroit College of Medicine, 1889; member of the House of Delegates of the American Medical Association in 1905; fellow of the American College of Surgeons; for many years surgeon in the mines of the Copper Range Company in Painesdale, Mich.; on the staff of the Hinsdale Sanitarium and Hospital; died June 16, aged 79, of carcinoma of the prostate and cecum.

Allan Sinclair White, Racine, Wis.; Michigan College of Medicine and Surgery, Detroit, 1899; fellow of the American College of Surgeons; served on the staff of St. Joseph's Hospital in Rice Lake; died in June, aged 69.

Henry Bristol Wideman, Nevada, Ohio; University of Wooster Medical Department, Cleveland, 1893; member of the American Medical Association; served as coroner of Wyandot County; died April 5, aged 75, of heart disease.

LIEUT. ANTHONY SALVATORE GRECO
M. C., A. U. S., 1917-1944

LIEUT. THOMAS ROBERT TURINO
(MC), U.S.N.R., 1906-1944

CAPT. EDWARD L. YOUNG III
M. C., A. U. S., 1914-1945

John Lawrence Widmyer, Primos, Pa.; Medico-Chirurgical College of Philadelphia, 1901; member of the American Medical Association; on the staff of the Delaware County Hospital, Drexel Hill; died in the Fitzgerald Mercy Hospital, Lansdowne, April 10, aged 67, of coronary occlusion.

William Hall Wynne ✠ Birmingham, Ala.; Birmingham Medical College, 1897; on the staffs of the Jefferson and Baptist hospitals; died May 28, aged 72, of heart disease.

KILLED IN ACTION

Anthony Salvatore Greco, Omaha; Creighton University School of Medicine, Omaha, 1941; interned at Creighton Memorial St. Joseph's Hospital; began active duty as a first lieutenant in the medical corps, Army of the United States, on July 1, 1942; killed in action in Italy June 22, 1944, aged 27.

Thomas Robert Turino ✠ Brooklyn; Columbia University College of Physicians and Surgeons, New York, 1931; specialist certified by the American Board of Obstetrics and Gynecology, Inc.; diplomate of the National Board of Medical Examiners; interned at the Brooklyn Hospital, where he served as associate gynecologist and obstetrician; commissioned a lieutenant in the medical corps of the U. S. Naval Reserve on Aug. 20, 1942; reported by the Navy as missing in action on July 18, 1943; presumptive date of death in the Pacific area July 19, 1944, aged 37.

Edward Lorraine Young III, Brookline, Mass.; Harvard Medical School, Boston, 1941; member of the American Medical Association; diplomate of the National Board of Medical Examiners; interned at the Massachusetts General Hospital, Boston; entered the medical corps, Army of the United States, as a first lieutenant on April 27, 1943; began active duty on May 8, 1943; promoted to captain; went overseas in March 1944, serving at a field hospital in the front line; killed in action in Germany March 24, aged 30.

Bureau of Investigation

ESTEP RUNS INTO GRIEF

"Mahatma" Apprehended in Mexico for Murder

In Memphis, where William Estep, also known as "Mahatma" and "Professor," has been styling himself "director" of the high-sounding Memphis Research Clinic, newspapers have reported that he was recently arrested in Mexico and held by Laredo, Texas, authorities for return to the Tennessee city to face a charge of second degree murder.

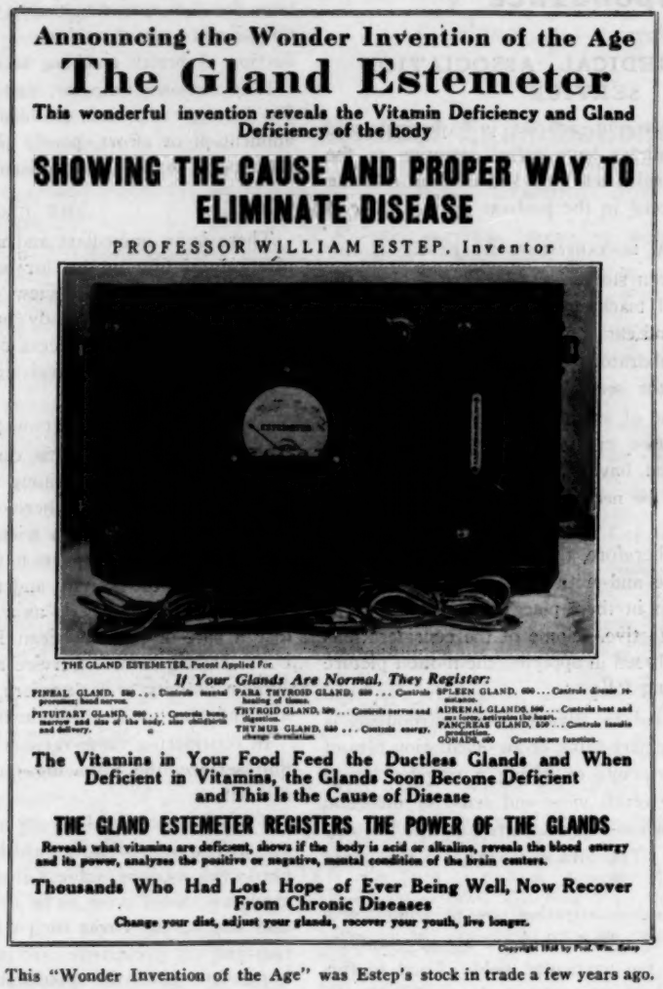
The earlier chapters of Estep's checkered career were last reviewed in this department of THE JOURNAL, Jan. 21, 1939, page 200. Briefly summarized, the article traced the "Mahatma's" career from 1930, when this Bureau first heard of him. In that year a Better Business Bureau bulletin reported that "Prof. Wm. E. Estep, proponent of 'Super Mind Science,' played Chicago in April. With the aid of a trained monkey and complimentary press notices, Estep attracted numerous followers to his 'free' lectures." Further, he claimed at that time to have degrees from two universities, whose existence investigation failed to substantiate. The bulletin further reported that a "Rev. Wm. Estep" had a record in Los Angeles, where he had been arrested in November 1923, following a raid on his "Spiritualistic Temple" and had been fined $250 when found guilty of obtaining money by false pretenses; that a follower and convert of Estep stated that the "Mahatma" took in $40,000 through his Chicago meetings, and that a plumber's assistant who had signed up for Estep's "Success Course" in Chicago, on the promise that it would make him a successful business man, had caused Estep's arrest when the course failed to touch on business. The case was dismissed in court when Estep made restitution.

Another bulletin from the same source reported shortly thereafter that Estep was accused of racketeering in his home town, Detroit, together with his wife and three other persons, in selling memberships at $40, including a supposed life insurance benefit to members under 50, in an alleged fraternity, the "Order of Temple Builders."

THE JOURNAL article showed that Estep's advertising represented that he was "the only American to ever qualify to become a mahatma. He was sponsored by Swami Ram Karan Dass, India's most noted Master Prophet."

Also there was the report from Kansas City, Mo., that Estep had been selling literature published by the Positive Christianity Publications, Washington, D. C., and taking $100 fees for courses leading to a degree that he called MS.D. (Doctor of Metaphysics), and that in 1938 he had incorporated a concern in Kansas City known as the Gland Estemeter Corporation, which, according to a newspaper notice, was, among other things, "to build, equip and maintain institutions for the treatment and care of the sick; to manufacture and sell Prof. Estep's 'Gland Estemeter' (patent applied for) . . . to deal in health foods; to deal in and dispose of such real and personal property and securities as are necessary to the conduct of said business . . ." THE JOURNAL article went on to state that an advertising folder on the Estemeter "indicates such blatant ignorance that it is astounding that any one would ever bother putting it into type. Still harder to believe is the idea that it could induce the prospect to purchase one of these machines, the reported cost of which is $250 (price not mentioned in folder)." The device was supposed to register various ductless glands according to "points" which would indicate their condition, and in accompanying literature Estep referred to the "wonderful" discovery of Dr. Albert Abrams, of whose preposterous quackery Estep was a disciple.

In June 1941 the Federal Trade Commission reported that its findings were that the Estemeter is incapable of detecting or disclosing improper or abnormal functioning of the glands and possesses no value in diagnosing diseases or conditions of the body, Estep's claims notwithstanding. The Commission therefore ordered Estep and his concern to discontinue the misrepresentations that had been made for the device. This case was briefly abstracted in THE JOURNAL Jan. 17, 1942, page 246.


Announcing the Wonder Invention of the Age
The Gland Estemeter
This wonderful invention reveals the Vitamin Deficiency and Gland Deficiency of the body
SHOWING THE CAUSE AND PROPER WAY TO ELIMINATE DISEASE
PROFESSOR WILLIAM ESTEP, Inventor
THE GLAND ESTEMETER. Patent Applied For
If Your Glands Are Normal, They Register:
The Vitamins in Your Food Feed the Ductless Glands and When Deficient in Vitamins, the Glands Soon Become Deficient and This Is the Cause of Disease
THE GLAND ESTEMETER REGISTERS THE POWER OF THE GLANDS
Reveals what vitamins are deficient, shows if the body is acid or alkaline, reveals the blood energy and its power, analyzes the positive or negative, mental condition of the brain centers.
Thousands Who Had Lost Hope of Ever Being Well, Now Recover From Chronic Diseases
Change your diet, adjust your glands, recover your youth, live longer.

This "Wonder Invention of the Age" was Estep's stock in trade a few years ago.

In November 1942 newspapers reported that Estep and some associates had been arrested in Pensacola, Fla., following indictment charging mail fraud and violation of the Securities Act of 1933. The charges were said to have followed the sale of stock in Estep's Rainbo and Trinity Gold Mines. In this connection it was brought out that Estep allegedly had represented that one of the followers of his Church of Positive Christianity and Supermind Science Cult had seen a "vision" that revealed a mountain of gold in Utah, which Estep proceeded to exploit. According to the Pensacola (Fla.) *News* of Sept. 6, 1944 Estep was found guilty in this case in December 1942 but, on appeal, his conviction was reversed.

In April 1945 a Memphis newspaper reported that William Estep, who had been enjoined from the practice of medicine in his Vita-Ray Clinic at Pensacola, Fla., had gone to Tennessee and opened the "Memphis Research Clinic," which he advertised as an "X-ray clinic for chronic diseases." The Memphis paper further reported that Estep's Florida license as a naturopathic physician had been revoked Nov. 23, 1942 by the Florida State Board of Medical Examiners, on the ground that it had been obtained fraudulently from the late Dr. George A. Munch, secretary of the old Eclectic Board, who served a sentence in federal prison for using the mails to defraud. It appears, however, that Estep entered an appeal before the Florida Supreme Court and that this is still pending.

In his latest escapade, according to a Memphis paper, Estep fled that place for Kansas City, Mo., whence he made his way to Mexico and was apprehended on May 31 in Monterrey. He was charged with murder in the second degree, resulting from the unlawful administration of certain drugs to a Negro woman, which resulted in her death. After the return of the first indict-

ment, according to the report, he fled from the jurisdiction of the court, forfeiting a bond of $1,500. While in Kansas City, it is said, he gave lectures on "health foods" until May 1, when he made a "quick exit," leaving a hotel bill unpaid. It is reported that when Estep came to Memphis he purchased property and recorded a Tennessee license as a "naturopathic physician" on January 15, but that after his clashes with the law the Tennessee State Board of Naturopathic Examiners had revoked his license.

These are the "Mahatma's" present difficulties. Will he see the light and abandon his long career in quackery? Probably not, unless some agency of government places him where any amount of mind science fails to return the cash of the credulous.

Correspondence

AN AMERICAN MEDICAL ASSOCIATION FILM SERVICE

To the Editor:—In five recent articles in American and British journals, various authors have called attention to the important developments in health teaching and medical training films which are bound to occur in the postwar period.

REASONS FOR SLOW DEVELOPMENT IN PAST

The motion picture has been slow in establishing a place for itself in the field of medical teaching. In the first place, this device with its limited eye and ear approach has had to compete with bedside teaching and laboratory teaching with their multiplicity of approaches. In the second place, medical teachers have made such extended use of actual specimens, photographs, teaching charts, lantern slides, cross sections and models in illustrating their lectures and have illustrated their textbooks and articles so lavishly that the need for the motion picture has not been apparent.

In the field of medicine, therefore, the use of the motion picture has had to be selective and with due deference to other methods of education, which in their place have proved to be more thorough and more effective. Some of the considerations on which selection has been based in applying the motion picture to medical and health teaching follow:

1. Films may often be used to advantage in introducing a new subject to a group. We may think of an orientation film of this type as utilizing the principle of taking a traveler up on the hilltop to give him an overall view and sense of direction before he enters the forest below and attempts to make his way through the trackless waste. The film so used has a real place in our medical schools.

2. Films may be helpful in demonstrating new principles, new technics and new apparatus to groups that are already familiar with the basic problems in the particular field. Used in this way as a means of keeping busy practitioners in touch with the latest developments in medicine, the film would appear to offer very attractive possibilities.

3. Where technicians must be trained for a specific task with a minimum of basic scientific training in order to save time and expense, films can often be made to do for such workers what would otherwise require extensive courses. For example, a film showing how carelessness with regard to aseptic technic in the operating room can cause postoperative infection may do for the Navy hospital corpsman much that a course in bacteriology does for the doctor in creating a respect for aseptic technic.

4. In the fields of school health education, college health education and public health condition, where the need is not for detailed knowledge but rather for a general, overall knowledge of hygiene, preventive medicine and public health in order to improve living habits and make for intelligent support of public health measures, motion pictures have an important part to play.

PROBABILITY OF RAPID DEVELOPMENT IN FUTURE

The experience of both the Army and the Navy in training medical technicians to meet their military duties, in preparing medical personnel for combating tropical diseases new to them and in warning line personnel as to the necessary precautions they must take if they are to avoid the diseases of the occupied areas has proved beyond any shadow of doubt the value of medical training and health teaching films. So convincing has been the demonstration that it is a generally accepted fact that the postwar period will see a tremendous increase in the production of health teaching and medical training films.

It is obvious, however, that unless a central clearing house for this type of film is established there is bound to be wasteful duplication of effort, poorly planned production and, in many instances, even complete misapplication of the film approach.

THE URGENT NEED

There is an immediate and urgent need for the establishment of a central film service for health teaching and medical training films which shall review, describe and catalogue (but not evaluate) all films already produced in these fields, list all medical films in the process of production and act as requesting, sponsoring and supervising authority for the production of medical films.

WHO SHOULD MEET THE NEED?

It is thinkable that this centralized film service for health teaching and medical training films should be set up (*a*) as an educational activity and therefore a part of the National Education Association, (*b*) as a scientific activity and therefore a part of the American Association for the Advancement of Science, (*c*) as a medical activity and therefore a part of the American Medical Association, (*d*) as a public health activity and therefore a part of the American Public Health Association or the U. S. Public Health Service and (*e*) as a motion picture production activity and therefore a function of the entertainment film industry or of the industrial film producers.

In considering these various groups as sponsors for a medical film service, the following facts should be given careful consideration:

Though educational theory and technic enter importantly into the production of both health teaching and medical training films, the medical subject matter rather than the educational approach would seem to be the dominating factor; both education and science cover such wide fields that practical organization and comprehensive coverage would appear difficult, if not impossible, under the sponsorship of either of these widely flung groups; the American Public Health Association and the U. S. Public Health Service are concerned almost entirely with preventive medicine and would therefore have little interest in the medical training films, though great interest in the health teaching films; there is but little profit in the production of medical films, so that if producers of entertainment or industrial films enter the medical film field they will probably do so only in a half-hearted way and as a minor part of their interest; whoever sponsors a central medical film service should have funds and facilities sufficient to provide films that will meet the needs of physicians, nurses and medical technicians both in training and in service.

In my judgment the American Medical Association is in the best position to serve as the central agency for the promotion and utilization of health teaching and medical training films.

D. F. Smiley, Lieutenant Commander (MC), U.S.N.R.

This communication has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this communication are those of the writer and are not to be considered as reflecting the policies of the Navy Department.

THE PHYSICIAN AND THE SELECTIVE SERVICE SYSTEM

To the Editor:—In retiring from Selective Service, after serving as chief of the Medical Division during the last four and one-half years, I have received literally dozens of letters complimenting us on what has been accomplished. Most of these letters, I note, came from physicians. In reading them and in thinking over the situation, it seems to me that the shoe really should be placed on the other foot. Hence I am writing to express the gratitude of the Medical Division of Selective Service to the 35,000 doctors and 10,000 dentists who have contributed so liberally of their time, effort and skill in handling the medical problems of the registrants.

No other group of people in the nation have given more liberally of themselves in the war than have these professional people. That was the opinion expressed by the late President Roosevelt at one of his wartime conferences.

The Medical Division of Selective Service in National Headquarters in Washington has enjoyed the complete support of the director, Major Gen. Lewis B. Hershey. It has had also the strong support and superlative leadership from the three Surgeons General of the Army, Navy and Public Health Service, from all the state headquarters and especially from all the state medical officers. The physicians attached to the 6,443 local boards, the consultants on the 660 medical advisory boards supplied all the demands made on them. They met fully and completely the nation's needs in the procurement of manpower for the fighting forces.

Such service should not be taken for granted nor should it be passed over without acknowledgment. Medicine has done a grand job in this war in Selective Service as well as in the Medical Corps of the Army, Navy and Public Health Service.

In leaving Selective Service I wish to express to all the civilian physicians and dentists in the Selective Service System my personal appreciation and that of the Medical Division at National Headquarters for the wholehearted service they have rendered throughout the last four and one-half years.

L. G. ROWNTREE, M.D.
Selective Service System,
Washington, D. C.

FEMALE INFERTILITY

To the Editor:—The communication from Dr. Roy J. Hefferman (THE JOURNAL, June 23) attempting to add another etiologic factor to the subject of female infertility has failed to furnish a rational biologic relationship between "voluntary sterility" and the direct impairment of the human reproductive organs. His warning against the use of contraceptives by newly married couples may be of considerable significance from the point of view of dogmatic theology, for sentimental justification or for some indefinite sociologic reasons. However, it lacks the establishment of a definite physiologic explanation for the alleged causation of a pathologic condition of the pelvic organs.

The pelvic pathologic conditions such as ovarian cysts, fibroids, endocervicitis and endometriosis enumerated by the correspondent are conditions present in sterile and in fertile females. This has been the observation of numerous gynecologists. The mere finding of pelvic pathologic conditions in women who have practiced "voluntary sterility" does not, logically or scientifically, justify the conclusion that this pathologic condition was the effect of the contraceptive practice. The assertion that "planned sterility by the use of contraceptives" constitutes a primary etiologic factor in the causation of pelvic pathologic conditions, with subsequent permanent sterility, or female infertility, is not borne out by clinical observation and is contrary to the biologic concept of organic changes.

DAVID DEUTSCHMAN, M.D., New York.

EPIDEMIC PLEURODYNIA

To the Editor:—I read with great interest the editorial in THE JOURNAL June 16 on the subject of epidemic pleurodynia. Reference is made to the apparent lack of microscopic studies of the affected tissues in these patients. In the late summer of 1935 I had an opportunity to see several of these patients at the Cincinnati General Hospital. One of these patients, a woman intern, had a small section of the latissimus dorsi muscle removed in the surgical service of the late Dr. Mont R. Reid. Microscopic study of this apparently affected muscle did not show any morphologic changes. These findings were reported in the *American Journal of the Medical Sciences* **191**:673 (May) 1936. At that time this appeared to be the first such study which had been made.

MELL B. WELBORN, M.D., Evansville, Ind.

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, July 21, page 900.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: January. Sec., Dr. B. R. Austin, 519 Dexter Ave., Montgomery 4.

ALASKA: Juneau, September. Sec., Dr. W. M. Whitehead, Box 561, Juneau.

ARKANSAS: * *Medical.* Little Rock, Sept. 20-21. Sec., Dr. L. J. Kosminsky, Texarkana. *Eclectic.* Little Rock, Nov. 8. Sec., Dr. C. H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral.* Los Angeles, Aug. 11. *Written.* Los Angeles, Aug. 13-16. Sec., Dr. Frederick N. Scatena, 1020 N St., Sacramento 14.

DISTRICT OF COLUMBIA: * *Reciprocity.* Washington, Sept. 10. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6150 E. Municipal Bldg., Washington.

ILLINOIS: Chicago, Oct. 9-11. Supt. of Registration, Department of Registration & Education, Mr. Philip Harman, Springfield.

INDIANA: Indianapolis, Aug. 28-30. Sec., Board of Medical Registration & Examination, Dr. W. C. Moore, 301 State House, Indianapolis 4.

LOUISIANA: New Orleans. Aug. 16-18. Sec., Dr. R. B. Harrison, 1507 Hibernia Bank Bldg., New Orleans 12.

MARYLAND: *Homeopathic.* Baltimore, Dec. 11-12. Sec., Dr. J. A. Evans, 612 W. 40th St., Baltimore.

MONTANA: Helena, Oct. 1-3. Sec., Dr. O. G. Klein, First Nat'l. Bank Bldg., Helena.

NEVADA: *Reciprocity.* Carson City, Aug. 6. Sec., Dr. G. H. Ross, 215 N. Carson St., Carson City.

NEW JERSEY: Trenton, Oct. 16-17. Sec., Dr. E. S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: * Santa Fe, Oct. 8-9. Sec., Dr. LeGrand Ward, 141 Palace Ave., Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Oct. 1-4. Sec., Dr. Jacob L. Lochner, Education Bldg., Albany.

SOUTH CAROLINA: Columbia, Nov. 13. Sec., Dr. N. B. Heyward, 1329 Blanding St., Columbia.

WISCONSIN: * Madison, Jan. 8-10. Sec., Dr. C. A. Dawson, Tremont Bldg., River Falls.

WYOMING: Cheyenne, Oct. 1-2. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

COLORADO: Denver, Sept. 5-6. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

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DISTRICT OF COLUMBIA: Washington, Oct. 22-23. Sec., Commission on Licensure, Dr. G. C. Ruhland, 6150 E. Municipal Bldg., Washington.

FLORIDA: DeLand, Nov. 3. Sec., Dr. J. F. Conn, Box 655, DeLand.

MICHIGAN: Ann Arbor and Detroit, Oct. 12-13. Sec., Miss Eloise LeBeau, 101 N. Walnut St., Lansing.

MINNESOTA: Minneapolis, Oct. 2-3. Sec., Dr. J. C. McKinley, 126 Millard Hall, University of Minnesota, Minneapolis 14.

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RHODE ISLAND: Providence, Aug. 15. Chief, Division of Examiners, Mr. Thomas Casey, 366 State Office Bldg., Providence.

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WISCONSIN: Madison, Sept. 22. Sec., Prof. R. N. Bauer, 152 W. Wisconsin Ave., Milwaukee 3.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Harrison Narcotic Drug Act: Illegal Issuance by Physician of Narcotic Prescriptions to Addict.—An indictment was returned to the district court of the United States, eastern district, New York, charging in six counts that Abdallah, who was licensed to practice medicine in New York, had violated a section of the federal narcotic drug laws [26 U. S. C. A. Internal Revenue Code, section 2554 (a)] by selling morphine to an addict without a written order on a form issued for that purpose by the Secretary of the Treasury. At the trial the government presented evidence that a stated agent of the United States Narcotic Squad made several trips to the vicinity of Abdallah's office with a drug addict; that on each occasion the agent searched the addict thoroughly, found nothing on him, and then gave him money; that each time the addict visited Abdallah and returned to the agent with a prescription or prescriptions for morphine, in combination with ephedrine, which prescriptions were promptly turned over to the agent; and that the agent on each occasion then drove the addict to the vicinity of a certain pharmacy, where the prescriptions were filled. The amount of the prescriptions varied with the amount of money given by the agent to the addict. There were six of these transactions from March 10 to March 30, 1943, and each transaction was the subject of a different count of the indictment. On the last three transactions Abdallah gave the addict several postdated prescriptions. There was evidence that Abdallha examined the addict at least once, and that the addict complained to him of asthma, that during the course of the examination the physician made the addict strip to the waist, and that the addict had needle marks on his arm, which the physician must have noticed and which ought to have put him on guard as to the addiction of his purported patient. The addict testified that the physician accused him of being an addict but nevertheless issued the prescription; and that the physician warned him not to fill the prescriptions with one druggist, not to carry the bottles on his person, and to tear the labels off the bottles and that the physician urged him to supply a friend in whose name future prescriptions could be made out. There was further evidence that the addict never had asthma and that the physician was well aware that morphine is not a specific remedy and should be used only in extreme cases to quiet a person with loss of sleep and then only with great caution. The evidence was undisputed that the addict obtained twelve prescriptions for morphine from the physician on six visits within a period of twenty days. On the addict's last visit to the physician he was given marked money, which the physician turned over to narcotic agents when they subsequently arrested him. After his arrest he could not produce any record showing the names of patients for whom he had prescribed narcotics. In lieu of the records he attempted to introduce at the trial his diary, but this showed discrepancies from the prescriptions presented in evidence by the government. The jury found the physician guilty on the three counts of the indictment covering the last three transactions between the physician and the addict in which the physician had given the addict several postdated prescriptions. The jury found the physician not guilty with respect to the first three counts, with respect to transactions in which single prescriptions had been issued to the addict. The physician then appealed to the circuit court of appeals, second circuit.

The government contended, in line with the holding by the circuit court of appeals, second circuit, in *United States* v. *Lindenfeld,* 142 F. (2d) 829, certiorari denied 65 S. Ct. 89, that Abdallah by his course of conduct had removed himself from the protection of a section of the federal narcotic laws [26 U. S. C. A. Internal Revenue Code, section 2554 (c) (1)], which excepts from the general prohibitions of the law distribution of narcotic drugs "by a physician . . . in the course of his professional practice only." Abdallah urged the court to reconsider its holding in the Lindenfeld case that the question as to whether the defendant comes within the exception was one of fact as to his good faith, for the jury to decide, and contended that there must be a consent or conspiracy between the physician and the druggist filling the prescription in order to render the physician's acts unlawful. The court, however, refused to reconsider its prior decision in the Lindenfeld case and in effect sustained the contention of the government and refused to entertain Abdallah's contention.

From the evidence, continued the court, the jury in the trial court was clearly entitled to infer Abdallah's bad faith. As a matter of fact, the jury seems to have exercised discrimination in its verdict, giving Abdallah the benefit of all possible doubt on the first three counts of the indictment, which charged the illegal issuance of a single prescription at a time, while finding him guilty on the last three counts, charging the issuance of several postdated prescriptions at a time, where bad faith seems undeniable. The physician contended, however, that the government failed to prove the filling of the prescriptions by a druggist, which he argued was a necessary element of the sale of narcotics as here charged. The evidence, answered the court, is contradictory as to whether or not the druggist filled the prescriptions according to directions, including ephedrine sulfate and milk sugar, or as to whether or not the addict obtained pure morphine sulfate instead. But as long as acquisition of the opiate as a result of the prescription is shown, we think it cannot excuse the wrongful act of the physician that the druggist did not fulfil the directions precisely or even took advantage of the opportunity to expand the illegal traffic. In either event the prescription is the instrument leading to the completion of the crime. Obviously the interest of the druggist is to obtain a seemingly legitimate basis for rapid depletion of his morphine stock and the physician has furnished him that opportunity by his prescription, whether it is followed to the letter or not. With its purpose thus fulfilled, the crime is complete.

The physician urged, however, that the crime here charged was completed through the agency of a decoy and detective, whose acts cannot be imputed to him so as to render him guilty of the offense charged, citing *People* v. *Lanzit,* 70 Cal. App. 498, 233 P. 816; *Dalton* v. *State,* 113 Ga. 1037, 39 S. E. 468; *State* v. *Decker,* 321 Mo. 1163, 14 S. W. (2d) 617; *Williams* v. *Georgia,* 55 Ga. 391; and *DeMayo* v. *United States,* 8 Cir., 32 F. (2d) 472. We need not consider, said the court, how far the principle urged by Abdallah may be soundly pressed, since all that the cases cited by the physician stand for is that acts done by a detective in building up the commission of an offense cannot be imputed to a defendant. They do not determine or limit the participants in steps leading to the completion of the offense once it is shown to have been committed. Here the crucial act was committed once the prescriptions were issued. The filling of the prescriptions merely carries the act to the final point where it becomes punishable as the crime in question. Thus the administering of poison may not constitute murder until the victim perishes; but once this occurs the act of administering constitutes the offense. The crucial act of the issuance of the prescriptions was one not performed by the detective or the addict, but by the defendant of his own volition and intent.

This holding, continued the court, disposes of an objection by the physician to his conviction on the last count for issuing prescriptions which were not filled until after his arrest. Nor do we find merit in a further contention by the physician as to entrapment. As was said in *United States* v. *Lindenfeld,* supra:

> Entrapment exists only when the government agents induce and originate the criminal intent of a defendant; there is none where the criminal intent is already present, and the agents merely afford the opportunity for the commission of a crime.

Despite the physician's claim of having been duped by the addict, the instructions given by the court to the jury and the jury's verdict negative the existence of the defense.

Finally, the defendant objected to the admission in evidence of 115 prescriptions for narcotics issued by him and found on a spot check of drug stores in the neighborhood of his office. These prescriptions, said the court, were competent and relevant evidence on the question of the physician's good faith and as such they are not barred, even if they tended to establish offenses other than the one with which the defendant was charged. The judgment of conviction was accordingly affirmed. —*United States v. Abdallah, 149 F. (2d) 219 (1945).*

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1935 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

15:123-164 (April) 1945

*Human Chronic Toxoplasmosis. W. J. Tomlinson.—p. 123.
*Fatality Due to Transfusion of Unpooled Plasma. E. C. Alberton. —p. 128.
Further Studies on Specific Streptococcal Antibody-Antigen Reactions in Poliomyelitis. E. C. Rosenow.—p. 135.
Unusual Carrier State. A. G. Hulett and H. Rubin.—p. 152.
Megakaryocytes and Blood Platelets. F. Levy.—p. 154.
Teratoma of Liver in an Infant. P. H. Hartz and A. van der Sar. —p. 159.

Human Chronic Toxoplasmosis.—The literature reveals that 13 cases of toxoplasma infection have been diagnosed at necropsy and 3 clinical cases have been diagnosed by recovery of the parasites from cerebrospinal fluid. Weinman, in a study of immunity in experimental toxoplasmosis, found that chronic toxoplasmosis in animals produced a different picture from the acute disease. Human chronic toxoplasmosis has not been demonstrated. While reviewing the necropsy material on sickle cell anemia, Tomlinson found an instance of chronic toxoplasmosis in a British West Indian Negro girl aged 10 years 8 months, who died of sickle cell anemia in the Canal Zone and who had no symptoms referable to toxoplasma infection. The case therefore represents the first reported case of chronic, asymptomatic human toxoplasmosis. Toxoplasma parasites were found in pseudocysts throughout the brain and in aggregates within myocardial fibers. They were not accompanied by inflammatory changes or necrosis.

Fatality Due to Transfusion of Unpooled Plasma.—Alberton reports a fatality following the use of unpooled plasma in which the cause of death was proved to be hemolytic reaction due to blood group incompatibility. The patient was a woman aged 77 who underwent a gastric resection for carcinoma of the stomach. A blood transfusion had to be stopped after 150 cc. of blood had been given. A transfusion of plasma was started two days later, but after only 100 cc. had been given the patient complained of severe lumbar pain. The patient rapidly became ashen gray and cyanotic. The transfusion was stopped with the first symptoms, and supportive measures were started. She died several hours later. The unpooled incompatible plasma saline mixture which had been infused was found to contain anti-A agglutinins active in a dilution of 1:2,048 (± 1:4,096). The patient had group A cells of average sensitivity. On the basis of this report the theoretical objections to the use of unpooled plasma are proved to have factual foundation. Unpooled plasma should be given only to homologous type recipients when the titer of agglutinins is not known.

American Journal of Diseases of Children, Chicago

69:267-338 (May) 1945

Progeria: Clinical, Metabolic and Pathologic Studies on a Patient. N. B. Talbot, A. M. Butler, E. L. Pratt, E. A. MacLachlan and J. Tannheimer.—p. 267.
Pyodermic Myiasis in Children: Observations, with Special Reference to Törsalo. L. Goldman.—p. 280.
Sulfathiazole Ointment for Prevention and Treatment of Pyodermas of Newborn Infants: Results Obtained with Five per Cent Sulfathiazole in an Oil in Water Type Emulsion Base. C. A. Weymuller and Elizabeth J. Ittner.—p. 283.
Amyotonia Congenita (Oppenheim): Report of 5 Cases with Necropsy; Discussion of Relationship Between Amyotonia Congenita, Werdnig-Hoffmann Disease, Neonatal Poliomyelitis and Muscular Dystrophy. W. F. Burdick, Dorothy V. Whipple and W. Freeman.—p. 295.

American J. of Obstetrics and Gynecology, St. Louis

49:603-718 (May) 1945

Total Abdominal Hysterectomy: Observations Based on Series of 1,925 Patients. W. F. Mengert and R. Stoltz.—p. 603.
*End Results in Treatment of Cervicitis. D. Findley.—p. 614.
Sex Precocity, Virilism, Adrenal Cortical Tumor. J. P. Pratt and R. L. Schaeffer.—p. 623.
Habitual Abortion. J. K. Quigley.—p. 633.
Duplication of Right Kidney Pelvis and Ureter with Extravesical Ureteral Opening. R. J. Moe.—p. 641.
Postmenopausal Pruritus Vulvae. B. L. Cinberg.—p. 647.
Penicillin Treatment of Sulfonamide Resistant Gonococcal Infections in Female. A. Cohn, H. C. Taylor Jr. and I. Grunstein.—p. 657.
Transmission of Penicillin Through Placenta: Preliminary Report. A. M. Hutter and J. Parks.—p. 663.
Action of Veratrone on Blood Pressure, Urine Volume and Urea Clearance in Toxemias of Pregnancy. J. R. Willson.—p. 665.
Thiamine Status During Pregnancy. A. C. Siddall and J. W. Mull. —p. 672.
Carcinoma of Ovary Treated Preoperatively with Deep X-Rays: Report of 3 Cases. T. J. Parks.—p. 676.
*Gangrene of Extremity in Newborn Child. M. D. Steiner.—p. 686.
Adenoacanthoma of Ovary. G. F. Melody, R. L. Faulkner and S. J. Stone.—p. 691.
Omphalocele (Amniocele): Its Anatomy and Etiology in Relation to Hernias of Umbilicus and Umbilical Cord. L. Margulies.—p. 695.
Rectal Maneuver for Placental Delivery, with Observations on Rectal Palpation in Third Stage. E. M. Greenberg.—p. 700.
Differential Diagnosis Between Fetal and Maternal Heart Rate. M. Berlind.—p. 703.

Treatment of Cervicitis.—Findley's observations are based on 240 cases of chronic cervicitis treated by the three generally accepted methods of electrosurgery: actual or nasal tip cauterization, electrocoagulation and conization. Microscopic studies were made before treatment and after healing was clinically complete. The average rates of healing were the same with all three methods. The percentage of satisfactory results was greatest after electrocoagulation, second after conization and least following cauterization. There was little difference between coagulation and conization in the terminal microscopic picture. Fibrous tissue reaction was low in both procedures, although slightly greater following cauterization. Complications most commonly encountered were hemorrhage, stenosis and pyometra and were most frequently seen following conization. Hemorrhage usually occurs from the tenth to the fifteenth day at the time of separation of the slough. Stenosis with resultant pyometra may be largely prevented by repeated dilation of the cervical canal. Carcinoma was discovered in 2 unsuspected cases out of 240 examined. Internal menstrual tampons were found to interfere with proper healing. Their use is to be condemned.

Gangrene of Extremity in Newborn Child.—Steiner observed gangrene of the upper left extremity in an infant born fifty hours after rupture of the membranes and two hours after the onset of labor. At delivery the affected extremity was found prolapsed between the cranium and the bony pelvis. Conservative therapy was ineffective and amputation was necessary on the eleventh day of life. To date, 42 similar cases have been reported in the literature. Trauma is the most likely cause of the condition.

American Journal of Pathology, Ann Arbor, Mich.

21:387-566 (May) 1945

Pathology of Trench Foot. N. B. Friedman.—p. 387.
Intranuclear Inclusions in Panleukopenia of Cats: Correlation with Pathogenesis of Disease and Comparison with Inclusions of Herpes, B Virus, Yellow Fever and Burns. A. M. Lucas and W. H. Riser. —p. 435.
Sarcosporidiosis or Toxoplasmosis in Man and Guinea Pig. B. H. Kean and R. G. Grocott.—p. 467.
Healed or Arrested Pulmonary Coccidioidomycosis: Correlation of Coccidioidin Skin Tests with Autopsy Findings. E. M. Butt and A. M. Hoffman.—p. 485.
Subacute Bacterial (Streptococcus Viridans) Pulmonary Endarteritis. A. E. Rhoden.—p. 507.
Acute Diffuse Demyelinating Encephalopathy: Report of 2 Cases. M. Friedman.—p. 519.
Regression Produced in Murphy Lymphosarcoma by Injection of Heterologous Antibodies. A. Nettleship.—p. 527.
Diagnosis of Granuloma Venereum from Frozen Sections Stained with Polychrome Methylene Blue. G. Margolis.—p. 543.
Arterial Occlusions Produced by Emboli from Eroded Aortic Atheromatous Plaques. C. M. Flory.—p. 549.

American Journal of Tropical Medicine, Baltimore

25:75-176 (March) 1945

Epidemiologic Aspects of Infectious Hepatitis in the U. S. Army. D. W. Walker.—p. 75.

*The Syndrome Tropical Eosinophilia and Microfilaria. A. van der Sar and H. Hartz.—p. 83.

*Heterophile Agglutinins and Cold Autohemagglutinins in Schistosomiasis, Filariasis, Malaria and Leprosy. G. J. Dammin and T. H. Weller. —p. 97.

Localization of Trivalent Radioactive Antimony Following Intravenous Administration to Dogs Infected with Dirofilaria Immitis. F. J. Brady, A. H. Lawton, D. B. Cowie, H. L. Andrews, A. T. Ness and G. E. Ogden.—p. 103.

Comparative Yields of Endameba Histolytica Organism t from Soluble and Insoluble Ingredients of Egg White in Freshly Prepared and Stored Medium. C. W. Rees and Lucy V. Reardon.—p. 109.

Immunity Reaction in Experimental Relapsing Fever. Y. P. Chen, S. H. Zia and H. H. Anderson.—p. 115.

Studies in Experimental Systemic Mycosis: 1. Systemic Chromomycosis (Chromoblastomycosis) in Mice: Preliminary Study. B. Levy and B. Black-Schaffer.—p. 117.

Observations on Microfilaria of Onchocerca Volvulus with Silver Stains. W. McKee.—p. 129.

Studies on the Microfilarial Periodicity of Litomosoides Carinii, Filariid Parasite of the Cotton Rat. S. D. Bell Jr. and H. W. Brown.—p. 137.

Experimental Studies and Critical Considerations Regarding the Life Cycle of Trypanosoma Cruzi. G. Elkeles.—p. 141.

Factors Influencing the Uneven Distribution of Aedes Aegypti in Texas Cities. A. C. Chandler.—p. 145.

Immunization Against Malaria: Unsuccessful Attempts to Increase Resistance of Ducklings to Plasmodium Lophurae Infections by Previous Injections of Materials Containing the Forssman Antigen. H. R. Jacobs.—p. 151.

Study of Effective Flight Range, Density and Seasonal Fluctuations in the Abundance of Anopheles Quadrimaculatus Say in Delaware. C. B. Huffaker and R. C. Back.—p. 155.

Toxoplasmosis Mistaken for Histoplasmosis in a Cat. H. D. Melenry. —p. 163.

Tropical Eosinophilia and Microfilaria.—Van der Sar and Hartz report 3 cases of tropical eosinophilia. In 1 case microfilariae could be demonstrated in the eosinophilic abscesses and infiltrate in the enlarged axillary lymph nodes. The symptoms disappeared after treatment with oxophenarsine hydrochloride. In a second case there was myeloid metaplasia of an axillary lymph node, consisting almost exclusively of eosinophilic myelocytes. In a fourth case which came to necropsy after an automobile accident hypereosinophilia of the blood and the liver was present; the spleen was enlarged and the subcapsular pulp contained enormous numbers of eosinophilic leukocytes and microfilariae. Eosinophilia was also found in the members of the family. In the last twenty-five years numerous publications have appeared concerning the occurrence of a hyperleukocytosis with hypereosinophilia, concurring clinically with enlargement of superficial lymph nodes, occasionally enlarged spleen and attacks of asthmatic bronchitis. Roentgenologically small bronchopneumonic foci could be demonstrated in some cases. Reports by Giffin in 1919, Aubertin and Giroux in 1921, Armand-Delille and Pierredon in 1927, Valledor and others in Cuba in 1939 and by Myers and Kouwenaar in the Netherlands East Indies in 1939 demonstrated the relationship between tropical eosinophilia and filariasis. The observations of the authors have demonstrated the relationship between tropical eosinophilia and filariasis and have reopened the discussion of the treatment of filariasis with arsenic.

Agglutinins and Autohemagglutinins in Tropical Diseases.—Heterophile agglutinin and cold autohemagglutinin titers were determined by Dammin and Weller in 123 cases of schistosomiasis, 104 cases of filariasis, 40 untreated cases of malaria and 18 cases of leprosy. In schistosomiasis, 4.9 per cent had heterophile agglutinin titers over 1:32, in filariasis 13 per cent had titers above 1:32, and of the malaria cases 5 per cent had titers above 1:32; in no case was the titer higher than 1:128. In the small group of blood specimens from patients with leprosy 4 showed a heterophile agglutinin titer of 1:128. Of 12 patients with malaria given quinine, 9 had a titer of 1:32 or lower and 3 a titer of 1:64. In 285 blood specimens, cold autohemagglutinins in a titer of 1:10 or higher could not be demonstrated in 279, or 97 per cent. The data indicate that heterophile antibody titers of clinical significance are not frequent in schistosomiasis, filariasis and malaria. From the results obtained no conclusions may be reached as to whether Wuchereria bancrofti and Schistosomum mansoni contain a heterophile antigen which at some stage in the disease process might produce significant antibody titers. It is possible that a titer of 1:64 in the 13 filariasis plasma specimens might represent such a stage of activity.

Archives of Dermatology and Syphilology, Chicago

51:295-358 (May) 1945

Hemangioendothelioma of Skin. Marcus R. Caro and C. H. Stubenrauch Jr.—p. 295.

Exfoliative Dermatitis Due to Sulfathiazole: Report of Case Characterized by Recurrent Attacks with Beau's Lines and Alopecia. M. J. Cook.—p. 305.

Roentgen Ray Therapy of Mycosis Fungoides. O. S. Levin and H. T. Behrman.—p. 307.

Some Phases of Vitamin Therapy in Dermatology. M. E. Obermayer and K. Frost.—p. 309.

Nitritoid Reaction Following Tryparsamide Therapy: Report of Case. L. J. Underwood.—p. 313.

Spread of Dermatitis Venenata by Vesicle Contents. A. G. Pratt and E. F. Corson.—p. 316.

Primary Tuberculous Complex of Skin: Occurrence in Woman Aged Sixty-Four.—p. 317.

Kaposi's Sarcoma and Lymphatic Leukemia: Report of Case with Histologic Evidence of Two Diseases in Same Lesion. W. Sachs and Margaret Gray.—p. 325.

*Cutaneous and Articular Manifestations in Lymphogranuloma Venereum: Activation of Disease by Frei Test. J. B. Hickam.—p. 330.

*Cutaneous Diphtheria as Military Problem: Review of Literature, with Report of Case. M. H. Saffron.—p. 337.

Cutaneous and Articular Manifestations in Lymphogranuloma Venereum.—The articular manifestations of lymphogranuloma venereum fall into one of three clinical categories: 1. Arthralgia with migratory pains in the joints, usually fleeting and without objective evidence of articular disease, is of common occurrence in the early weeks of the infection. 2. There may be acute polyarthritis with painful swelling of the joints, redness and increased temperature of the overlying skin. 3. Chronic recurrent polyarthritis with effusion is a third articular manifestation. There may be recurrent episodes of effusion into joints, but these do not result in deformity or permanent impairment of function. The wide variety of cutaneous lesions occurring in lymphogranuloma venereum are generalized or limited to the region especially affected by the virus. In the latter group belong the ulcerative disorders classified by Wien and Perlstein as (1) simple ulceration of the skin, (2) ulceration secondary to involvement of lymph nodes and (3) ulceration developing on an esthiomene. The generalized cutaneous lesions are either erythema nodosum or erythema multiforme. Hickam presents the histories of 4 patients with lymphogranuloma venereum. The articular manifestations in these patients resembled those described by other authors except for the additional presence of acute tenosynovitis and bursitis with effusion. All forms of involvement subsided rapidly. A generalized pustular eruption occurred in 3 patients. In 2 patients it was thought to be evoked by the intradermal Frei test with chick embryo antigen (lygranum). Two patients had severe reactions to the Frei test with an exacerbation of certain of the manifestations of the disease. It is suggested that the preparation of chick embryo antigen be diluted for use for patients whose disease appears to be in an active stage.

Cutaneous Diphtheria.—Diphtheritic infection of the skin has been noted with considerable frequency among the armed forces. It exists in two forms: a rare, acute variety almost invariably associated with faucial or nasal diphtheria, consisting of a solitary lesion which may develop on an intact or previously abraded site, and a chronic form characterized by multiple indolent lesions, which occasionally develop from the acute type but more commonly result from superinfection by Corynebacterium diphtheriae of preexisting dermatoses such as pyodermas, scabies and fungous infections. The treatment consists in the use of diphtheria antitoxin in fairly large doses. Saffron reports the case of a soldier aged 31 who had an acute faucial and cutaneous diphtheria. Thirty thousand units of diphtheria antitoxin was given intramuscularly on the first day and 28,000 units the following day. The axillary lesion was treated by local wet applications of 2,500 units of penicillin every three hours. The temperature had fallen to normal within twenty-four hours, and the throat cleared completely within seven days. Pain and swelling disappeared in the axillary region within forty-eight hours, but the lesion healed slowly. The membrane

disappeared after a few days, but the necrotic base persisted and eighteen days were required for complete healing. This is the first reported instance of local use of penicillin in cutaneous diphtheria.

Archives of Pathology, Chicago

39:281-350 (May) 1945

Chronic Exudative and Indurative Pneumonia Due to Inhalation of Shellac. E. F. Hirsch and H. B. Russell.—p. 281.
Diffuse Meningeal Fibroblastoma of Brain and Spinal Cord: Report of 3 Cases. S. R. Haythorn, W. Shapera and H. C. Stewart.—p. 287.
Morphologic Studies of Rats Deprived of Essential Amino Acids: I. Phenylalanine. M. E. Maun, W. M. Cahill and Ruth M. Davis.—p. 294.
*Pathology of Anaphylaxis Due to Sulfonamide Drugs. B. Black-Schaffer.—p. 301.
Primary Systemic Amyloidosis. S. Lindsay and W. F. Knorp.—p. 315.
Proliferation of Muscle Cells in Myometrium of Nonpregnant Uterus. P. H. Hartz.—p. 323.
Periarteritis Nodosa-like Lesions in Rats Fed Thiouracil. D. Marine and E. J. Baumann.—p. 325.
Neoplastic Diseases of Human Hypophysis. J. E. Kraus.—p. 343.

Pathology of Anaphylaxis Due to Sulfonamide Drugs.—The universal use of sulfonamide compounds and the discovery that they can act as antigens capable of eliciting fatal reactions have for the first time made possible the study of a large number of relatively slow but fatal anaphylactic reactions. Black-Schaffer describes the lesions discovered in 5 cases of anaphylactic death following therapeutic use of sulfonamide compounds. The basic lesion, as in experimental protein anaphylaxis, is necrotizing fibrinoid arteritis of the smaller vessels. The cellular exudate is monocytic in composition. The reticuloendothelial system is hyperplastic; in the spleen, the lymph nodes and the marrow the sinusoids may be crowded with macrophages showing phagocytosis of erythrocytes and leukocytes. This phenomenon may be the morphologic expression of the addition of some substance to the blood cells (conjugated sulfonamide group?) that renders them "foreign." The possibility that these homologous "foreign cells" may elicit the production of antibodies is suggested and may account for the hemolytic anemia, the leukopenia and the agranulocytosis. The available evidence indicates that the nephrosis in cases of reaction to treatment with sulfonamide compounds is a form of anaphylactic renal reaction. The identity of the lesions with those produced in a few human subjects and many animals by known species-foreign proteins, the knowledge that the sulfonamide compounds may convert homologous proteins into allergens and the fact that characteristic clinical syndromes follow the administration of the drugs constitute sufficient evidence to justify the concept of the anaphylactic nature of the lesions described.

Arkansas Medical Society Journal, Fort Smith

41:245-262 (May) 1945

Plea for Conservatism in Management of Acute Cardiac Crises. A. T. Barr.—p. 245.
Modern Concepts of Cardiovascular Disease: Hypertension as Viewed from Its Surgical Treatment (Part II). C. T. Chamberlain.—p. 248.

42:1-28 (June) 1945

Penicillin in Medicine. F. W. Harris.—p. 1.
Modern Concepts of Cardiovascular Disease. C. T. Chamberlain.—p. 6.

Bulletin of Johns Hopkins Hospital, Baltimore

76:155-177 (April) 1945

*Report of Case of Idiopathic Congenital (and Probably Familial) Methemoglobinemia. A. Graybiel, J. L. Lilienthal Jr. and R. L. Riley.—p. 155.
Report of Case of Acute Interstitial Fibrosis of Lungs. H. Eder, C. Van Zandt Hawn and G. Thorn.—p. 163.

Idiopathic Congenital Methemoglobinemia.—Graybiel and his associates report the history of a boy who had been blue at birth and had remained so. He was troubled with fatigue and shortness of breath. At the age of 17 he left school and began to do light work. His diet was adequate and contained relatively large amounts of ascorbic acid. He had never taken drugs known to cause cyanosis or pigmentation. The family history revealed that a cousin also had been blue at birth and had died at 14. Examination revealed that the youth, now 19, had intense cyanosis of the ears, tongue, lips and especially the gingival margins of the gums. The scleral vessels were dark blue, and the retinal arteries and veins appeared almost black. A sample of arterial blood was chocolate colored. Tests indicated that 38 per cent of the circulating blood pigment could not combine with carbon monoxide and presumably was methemoglobin. This presumption was confirmed by spectroscopic analysis. The patient was given 100 mg. of ascorbic acid and 0.6 Gm. of sodium bicarbonate three times daily by mouth. Four days later the patient's scleras appeared to be less injected and the lips slightly less cyanotic; the methemoglobin percentage, determined by the carbon monoxide method, had fallen. Later the daily dose of ascorbic acid and of sodium bicarbonate was doubled and after nineteen days of treatment the methemoglobin concentration had fallen from 8.1 Gm. to 1.7 Gm. and the normal hemoglobin had increased from 13.1 Gm. to 15.8 Gm. Exercise tolerance tests showed great improvement in the capacity for hard physical work. The striking clinical feature of this case of idiopathic congenital methemoglobinemia was the intense cyanosis, which was out of proportion to the other clinical aspects. Attention is drawn to the features which are common to both idiopathic methemoglobinemia and congenital heart disease with cyanosis. Simple inspection of a drop of the patient's blood may provide the differential clue. It is likely that some cyanotic patients now regarded as having congenital heart disease have, in fact, methemoglobinemia. Ascorbic acid, a biologic reducing substance, is capable of converting methemoglobin to normal hemoglobin in vivo.

Diseases of Chest, Chicago

11:203-296 (May-June) 1945. **Partial Index**

Segments of Lungs from Standpoint of Surgical Procedures. B. Blades.—p. 203.
Diasone in Treatment of Pulmonary Tuberculosis. K. H. Pfuetze and Marjorie Pyle.—p. 213.
*Present Status of Chemotherapy in Tuberculosis from the Clinical Standpoint. K. H. Pfuetze.—p. 220.
Tuberculosis of Nasopharynx: Its Frequent Incidence and Clinical Significance. A. R. Hollender and P. B. Szanto.—p. 227.
Irreversible Allergy in Nontuberculous Diseases of Chest. M. B. Cohen.—p. 236.
Surgical Closure of Patent Ductus Arteriosus. J. W. Nixon.—p. 241.
Pulmonary Embolism. L. N. Katz.—p. 249.
Tuberculosis and Pregnancy. A. MacDowell.—p. 256.
Tuberculosis Problem and Organization of Tuberculosis Campaign in Venezuela. J. I. Baldo.—p. 259.
Symposium: Tuberculosis in World War II. C. M. Hendricks.—p. 266.

Chemotherapy of Tuberculosis.—Pfuetze reviews experiences with several sulfonamides in the treatment of tuberculosis. Promin, though probably of value in some cases, is too toxic for widespread general use. Diasone, though less toxic than promin, clinically falls far short of original expectations. Promizole, which is much less toxic than either of the other two, is still under clinical investigation, thus precluding accurate evaluation at this time.

Iowa State Medical Society Journal, Des Moines

35:165-210 (May) 1945

One Man's Opinion. M. C. Hennessy.—p. 165.
Medical Management of Uncomplicated Peptic Ulcer. W. D. Paul and C. Rhomberg.—p. 167.
Hypersensitivity and Other Toxic Reactions to Sulfonamides. J. E. Flynn.—p. 185.
Use of Penicillin and Sulfadiazine Locally in Oral Infections: Preliminary Report. A. C. Woofter and O. E. Hoffman.—p. 189.

35:211-246 (June) 1945

Therapeutic Agents in Treatment of Glaucoma. W. N. Hahn.—p. 211.
Incidence, Prognosis and Curability of Malignant Lesions: Brief Review. C. F. Dixon.—p. 215.
*Administration of Penicillin by Mouth in Combination with Aluminum Dihydroxy Aminoacetate. W. D. Paul, C. Rhomberg, A. P. McKee and J. W. Pichette.—p. 219.
Thrombosis of Hepatic Veins (Chiari's Disease): Case. J. E. Flynn.—p. 221.

Penicillin by Mouth with Aluminum Dihydroxy Aminoacetate.—Paul and his associates say that recently the new aluminum buffer antacid aluminum dihydroxy aminoacetate (Alglyn) has been investigated at the University of Iowa Hospital. This is a combination of aluminum with aminoacetic acid containing 18.3 per cent aluminum and 9.3 per cent nitrogen. The aminoacetic acid causes rapid buffering action, while the aluminum gives a prolonged effect. The authors used oral

medication with penicillin and aluminum dihydroxy aminoacetate in the treatment of 16 patients with gonorrhea and 1 with sinusitis complicating scarlet fever. The patients with gonorrhea were given 100,000 to 300,000 units of penicillin, while a woman aged 24 showed clinical and bacteriologic cure with only 100,000 units of penicillin given as a single dose. Within two hours gonococci could no longer be cultured from the cervix. A youth aged 19, who developed acute sinusitis during the course of scarlet fever and could not tolerate sulfadiazine, made a prompt clinical recovery after 320,000 units of penicillin in divided doses was given. Alglyn, because of its immediate and prolonged buffering action, is a satisfactory antacid to combine with penicillin for oral administration.

Journal of Bone and Joint Surgery, Boston

27:179-360 (April) 1945

*Development of Sarcoma in Bone Subjected to Roentgen or Radium Irradiation. C. H. Hatcher.—p. 179.
*Treatment of Benign Giant Cell Tumors by Resection or Excision and Bone Grafting. H. W. Meyerding.—p. 196.
Evaluation of Estimated Percentage of Growth from Distal Epiphysial Line. I. E. Hendryson.—p. 208.
Adhesive Capsulitis of Shoulder: Study of Pathologic Findings in Periarthritis of Shoulder. J. S. Neviaser.—p. 211.
*Results of Modern Methods of Treatment of Poliomyelitis. R. W. Johnson Jr.—p. 223.
Bullet Fractures of Long Bones. H. E. Branch.—p. 227.
Intervertebral Disk: Its Microscopic Anatomy and Pathology: Part II. Changes in Intervertebral Disk Concomitant with Age. M. B. Coventry, R. K. Ghormley and J. W. Kernohan.—p. 233.
Uncovertebral Osteophytes and Osteochondrosis of Cervical Spine. E. Lyon.—p. 248.
Results of Epiphyseodesis and Femoral Shortening in Relation to Equalization of Limb Length. R. Straub, T. C. Thompson and P. D. Wilson.—p. 254.
Closed Manipulation for Reduction of Fractures of Neck of Radius in Children. R. R. Goldenberg.—p. 267.
Wire Fixation in Acromioclavicular Dislocation. F. A. Bloom.—p. 273.
Surgical Approaches to Knee Joint. L. C. Abbott and W. F. Carpenter. —p. 277.
Adjustable Casts in Treatment of Joint Deformities. F. W. Rhinelander and Marian W. Ropes.—p. 311.
Research Work on More Precise Method of Determining Muscle Strength in Poliomyelitis Patients: New Muscle Tester. A. A. Schmier.—p. 317.
Regeneration of Patella: Case Report. W. P. Corriero, C. Aquavella. —p. 326.
Treatment of Fractures of Olecranon by Fixation with Stainless Steel Screws. P. H. Harmon.—p. 328.
Multiple Rib Fractures Treated with Drinker Respirator: Case Report. K. Hagen.—p. 330.
Retrospective Commentary on Campaign for Establishment of Positive Standard of Treatment for Fracture of Neck of Femur. R. Whitman. —p. 334.

Development of Bone Sarcoma Following Irradiation.—The literature contains reports of 24 patients who developed bone sarcoma following exposure to x-rays or radium. Seventeen of these tumors resulted from roentgen therapy for tuberculous arthritis. One followed similar treatment for acute arthritis. In 6 cases bone sarcoma followed exposure to radium. Hatcher reports histories of 3 patients in whom irradiation appears to have been responsible for the development of bone sarcoma. In each of these cases the tumor arose in normal bone which had been in the field of irradiation directed toward earlier independent tumors. Two are chondrosarcomas and 1 is a fibrosarcoma with tumor cartilage. In all cases except 1 the amount of irradiation was large and was administered in fractional doses over a long period. The interval between irradiation and recognition of irradiation-produced sarcoma is long. The median time in reported cases is six years.

Excision and Bone Grafting in Benign Giant Cell Tumors.—Meyerding reports 40 cases of benign giant cell tumor of bone in which excision of the tumor and bone grafting were employed. A history of injury was elicited in 23 cases. The average duration of symptoms before operation was 23.5 months. Treatment prior to consultation and operation at the clinic had consisted of immobilization, diathermy, elimination of foci of infection, arthritis vaccines, aspiration, irradiation, excision and irradiation, and excision and bone grafting. In 2 of the cases a diagnosis of sarcoma had been made and amputation had been advised. Diagnosis of benign giant cell tumor usually can be made on the basis of the history and the clinical and roentgenographic findings. Close cooperation between the pathologist and the surgeon at the time of the operation is essential. The differential diagnosis of benign giant cell tumor and malignant giant cell sarcoma cannot be made on the basis of roentgenographic interpretation alone. Adequate exposure and the removal of a block of tissue will make possible microscopic examination. Should there be doubt that the lesion is benign, the wound should be closed and the pathologist given additional time. This sometimes is necessary in cases in which a previous operation has been performed, in cases in which irradiation has been employed and in cases in which the tumor is infected; it is rarely necessary if previous treatment has not been given. Curettage of a giant cell tumor should consist of a complete excision. Usually the graft is taken from the tibia, fibula, ilium or a sound portion of the involved bone. The best results are obtained in cases in which the cavity is packed firmly with autogenous bone, and when complete rest is assured by a plaster of paris cast. In cases in which the tumor is situated in the region of the knee or the ankle, weight bearing should be avoided until the roentgenographic examination discloses sufficient deposition of bone to stand the stress and strain. Good functional results were obtained in 38 of the 40 cases. Excision of the tumor and bone grafting is a safe procedure in properly selected cases, and it tends to prevent deformity and disability.

Treatment of Poliomyelitis.—Johnson recommends in the acute stage bed rest, sedation for restlessness and pain and half-shell plaster molds or "Toronto" type splints for paralyzed, weakened or tender extremities in positions of relaxation. Frequent checks are made of muscle power. Hyperesthesia or muscle tenderness is also checked. Except in the encephalitic type, the author has not had clinical evidence of spasticity in the paralyzed extremities. Stiff necks and backs are usual in the early days, but they tend to disappear spontaneously. Radiant heat is administered intermittently as a stimulant to local circulation. In the convalescent period gentle massage is administered to the paralyzed or weakened groups and is increased slowly in depth and force as soon as hypersensitivity permits. Limited passive motion is begun in joints where muscle power is below 50 per cent, and active motion is started in an increasing range as the muscles grow in strength. Graduated exercises are given for weakened muscles. Patients who seem destined to have some disability are turned from invalidism and self pity toward an attitude of adaptability and compensation. In the wards the children help one another to achieve this end. Ward patients do much better in this respect than patients in private rooms. Later, underwater exercise in pools is used. The benefit of a crusade of the Sister Kenny type is that it makes us reexamine our own therapeutic procedures. Johnson has remained unimpressed by the claims of superiority of the Sister Kenny treatment. Patients are not cured, they recover; and the author rates recovery not in case units, because misleading statistics are produced in this way. The proper unit is the weakened and paralyzed muscle, and recovery is judged on final muscle power as compared with the original degree of paralysis. The record of each muscle is kept separately. For this analysis the author has selected ten commonly paralyzed and important muscles: gluteus maximus, gluteus medius, quadriceps, hamstrings, gastrocnemius, tibialis anterior, deltoid, biceps humeri, triceps brachi and opponens pollicis. Figures shown in tables concern 64 patients. The paralyzed muscle units reported are 350 in the lower extremity and 106 in the upper extremity. All muscles should have three months of careful and painstaking protection and treatment comparable to that given in peripheral nerve lesions. At the end of such a three months regimen a prognosis of recovery can be arrived at, for the muscles can then be differentiated into three categories: (*a*) Those which have not recovered to a point of 30 per cent of power in three months. No return of useful power is to be expected, and these make up the permanently paralyzed extremities. (*b*) Those which by this time have 80 per cent or more power and can be counted on to function satisfactorily without further treatment except general supervision. (*c*) The group which has demonstrated some return of

power and has a three month level of 30 to 75 per cent. These have potentiality for further recovery to a point where useful function can be restored. These cases are the important ones as far as further active treatment is concerned. No appreciable recovery continues beyond eighteen months even under ideal conditions, but untreated or inadequately treated cases have been salvaged by this regimen as late as six to ten years after the acute attack, indicating a previous nerve recovery which had been masked or nullified by the overstretching or overfatigue of the muscle or by opposing contracture.

Journal of Neurophysiology, Springfield, Ill.

8:137-217 (May) 1945

Cholinesterases in Sympathetic Fibers and Ganglia. C. H. Sawyer and W. H. Hollinshead.—p. 137.
Changes in Brain Potentials During Convulsions Induced by Oxygen Under Pressure. R. Cohn and I. Gersh.—p. 155.
Electroencephalographic Changes Following Head Injuries in Dogs. R. S. Dow, G. Ulett and A. Tunturi.—p. 161.
Sensory-Motor Nerve Crosses in Rat. P. Weiss and M. V. Edds Jr. —p. 173.
Color Receptors of Mammalian Retina. R. Granit.—p. 195.
Effect of Temperature on Artificial Synapse Formed by Cut End of Mammalian Nerve. R. Granit and C. R. Skoglund.—p. 211.

Journal of Nutrition, Philadelphia

29:289-364 (May) 1945

Existence of Microbiologically Inactive "Folic Acid"-like Material Possessing Vitamin Activity in Rat. L. D. Wright, Helen R. Skeggs, A. D. Welch, K. L. Sprague and P. A. Mattis.—p. 289.
Mitotic Activity and Wound Healing in Corneal Epithelium of Vitamin A Deficient Rats. J. S. Friedenwald, W. Buschke and Mary Ellen Morris.—p. 299.
*Studies on Comparative Nutritive Value of Fats: VI. Growth and Reproduction Over Ten Generations on Sherman Diet B Where Butterfat Was Replaced by Margarine Fat. H. J. Deuel Jr., Lois F. Hallman and E. Movitt, with technical assistance of Evelyn Brown. —p. 309.
*Composition of Typical Mexican Foods. R. Cravioto B., E. E. Lockhart, R. K. Anderson, F. De P. Miranda and R. S. Harris, with technical assistance of Estela Aguilar and others.—p. 317.
Study of Nicotinic Acid Restriction in Man. A. P. Briggs, S. A. Singal and V. P. Sydenstricker.—p. 331.
Effect of Level of Protein in Diet on Utilization of Vitamin A. Marie Dye, Ione Batemen and Thelma Porter.—p. 341.
Nutritive Value of Fatty Acids of Butter Including Their Effect on Utilization of Carotene. Elizabeth F. Brown and W. R. Bloor.—p. 349.
*Effect of Atabrine on Thiamine Deficiency in Young Rat. D. M. Hegsted, J. M. McKibbin and F. J. Stare.—p. 361.

Margarine in Diet of Rats.—Deuel and his associates report observations on reproduction and growth rate in ten generations of rats fed with a modification of the Sherman diet B in which butterfat has been replaced by margarine fat fortified with vitamin A. The growth rate considerably exceeded that obtained with animals on the stock diet and progressively improved with the later generations. A vegetable fat such as that contained in a margarine can serve adequately in place of butterfat for growth and reproduction on a diet otherwise nutritionally satisfactory.

Composition of Typical Mexican Foods.—Cravioto B. and his associates analyzed 112 samples of food from Mexico for the content of carotene, thiamine, riboflavin, niacin, ascorbic acid, calcium, phosphorus, iron, nitrogen, ash and total solids. Many of these foods were analyzed for the first time. The kinds and nutritional qualities of the foods of Mexico are so different from those of the United States that the nutrition program in Mexico should be based on the nutrient content of Mexican foods. Many Mexican foods are richer in specific nutrients than foods in the United States. It is probable that the Mexican diet is more adequate in ascorbic acid, thiamine, phosphorus and calcium than in riboflavin, niacin and quality protein.

Effect of Atabrine on Thiamine Deficiency.—According to Hegsted and his associates previous studies on the relation of nutrition to the tolerance of atabrine by rats led to the demonstration of a "choline-like" or "choline sparing" action of atabrine. Addition of atabrine to a thiamine deficient diet for rats delayed loss of weight, onset of symptoms and death. Low levels of thiamine produced greater gains in animals receiving atabrine than in controls. Atabrine thus has a "thiamine sparing" action.

Journal of Urology, Baltimore

53:507-646 (April) 1945

Possible Usefulness of Estrogens and Aluminum Hydroxide Gels in Management of Renal Stone. E. Shorr.—p. 507.
Arteriography in Renal and Abdominal Conditions. O. A. Nelson. —p. 521.
Treatment of Ureteral Calculi: Report of 504 Cases in Which the Councill Stone Extractor and Dilator was Used. W. A. Councill. —p. 534.
Excretory Cystourethrograms. J. W. Draper and J. G. Siceluff.—p. 539.
Transurethral Resection in Treatment of True and Pseudo Cord Bladder. J. L. Emmett.—p. 545.
Operations for Urinary Control of Neurogenic Bladders. R. E. Van Duzen.—p. 565.
Treatment of Urinary Incontinence in Vesical Paralysis. R. E. Hanlon. —p. 572.
Thrombin (Topical) as Hemostatic Aid in Prostatic Surgery. V. J. O'Conor.—p. 584.
Evaluation of Thrombin Following Transurethral Resection: Study of 40 Consecutive Cases. A. Palomo.—p. 590.
Advances of Technic of Transurethral Prostatic Resection. L. H. Rodriguez Diaz.—p. 594.
Operation for Undescended Testicle: Report of Cases. J. K. Ormond, R. M. Cothran and J. A. Singiser.—p. 602.
Use of Penicillin in Treatment of Urogenital Infections: Clinical Study of 509 Gonococcal and 26 Nongonococcal Infections of Urogenital Tract. L. R. Reynolds and H. M. Weyrauch.—p. 614.
Use of Penicillin in Sulfonamide Resistant Gonorrhea in Male. S. L. Raines, G. S. Barrett and Jesse M. Galt.—p. 630.
Penicillin Treatment of Sulfonamide Resistant Gonorrhea. L. H. Doolittle and H. B. Marshall.—p. 634.

Military Surgeon, Washington, D. C.

96:377-456 (May) 1945. **Partial Index**

Convalescence and Rehabilitation in General Hospital in Tropics. H. N. Neu and F. K. Urban.—p. 377.
Medical Problems of Air Warfare. M. S. White.—p. 385.
Military Aspects of Acute Rheumatic Fever. W. P. Holbrook, A. C. Van Ravenswaay.—p. 388.
Inspection of Fresh Meat and Meat Food Products and Dairy Products. S. C. Dildine.—p. 391.
Restoration of Functions of Limbs. A. N. Leontiev.—p. 397.
Medical Problems Encountered in Field Hospital on Saipan-Tinian Operations. C. L. Saint.—p. 399.
Caldwell-Luc Operation for Chronic Suppurative Maxillary Sinusitis of Traumatic Origin. G. W. Christiansen and J. L. Bradley.—p. 406.
Experiences and Progress in Treatment of Gonorrhea in Army General Hospital Overseas, 1942-1944. J. H. Harrison, T. W. Botsford and B. E. Trichel.—p. 416
Management of Pilonidal Disease. P. B. Van Dyke.—p. 420.
Pilonidal Cyst: Excision and Primary Wound Closure. R. C. Alley and C. O. Richey.—p. 422.
Complications of Staphylococcus Sepsis: Treatment by Intrapleural and Intrapericardiac Injections of Sulfa Compounds. I. L. Applebaum. —p. 424.
Nicola Operation. H. G. Kunz.—p. 429.

Nebraska State Medical Journal, Lincoln

30:157-188 (May) 1945

State Rheumatic Fever Program for Children. J. A. Henske.—p. 160.
Public Health Aspect of Rheumatic Fever. E. J. Kirk.—p. 165.
Recent Advances in Rheumatic Fever. J. M. Thomas.—p. 167.
Role of Electrocardiogram in Diagnosis and Prognosis of Heart Disease. M. C. Andersen.—p. 169.
Subacute Bacterial Endocarditis Treated with Penicillin and Dicumarol. G. H. Misko.—p. 171.
Treatment of Burns: General Care of Burned Patient. H. N. Harkins. —p. 175.

New England Journal of Medicine, Boston

232:491-520 (May 3) 1945

*Cardinal Manifestations of Paroxysmal Tachycardia: I. Anginal Pain. L. Wolff.—p. 491.
Modification of Old and Simple Method of Treating Rectal Prolapse. G. Van S. Smith.—p. 495.
Radioulnar Synosteosis of Traumatic Origin: Report of Case. H. G. Lee.—p. 498.
Scarlet Fever. C. Wesselhoeft and L. Weinstein.—p. 500.

Pain in Paroxysmal Tachycardia.—Wolff analyzes the clinical data of 253 cases of paroxysmal tachycardia with reference to the occurrence of chest pain. It occurred in 16 per cent of the cases in this series. Anginal pain is invariably provoked by paroxysms of rapid heart action in patients with angina pectoris, provided the ventricular rate is 150 (the critical level) or more. In the great majority of cases in which paroxysmal tachycardia induces anginal pain, coronary heart disease, usually with angina pectoris, is present. The association of anginal pain and paroxysmal tachycardia with ventricular rates under 150 or regardless of the rate in patients without a history of angina pectoris suggests various diagnostic possibilities,

both cardiac and noncardiac. Paroxysmal tachycardia does not always enhance the pain of acute myocardial infarction. The failure of paroxysmal tachycardia to induce pain does not exclude the presence of coronary heart disease, acute, recent or old myocardial infarction or angina pectoris in the past.

New Orleans Medical and Surgical Journal

97:433-478 (April) 1945

Atypical Amebic Colitis. D. N. Silverman and A. Leslie.—p. 435.
Diagnosis and Treatment of Acute Diarrheal Disorders. J. Watt.—p. 438.
Comparison of Incidence and Treatment of Meningitis Over Ten Year Period. H. E. Rollings and J. H. Musser.—p. 445.
Effects of Inadequate Ascorbic Acid Intake. H. R. Hyslop.—p. 452.
Pathogenesis of Hypertension. W. P. Sloan Jr.—p. 457.

97:479-520 (May) 1945

Health Department of the Future: Discussion of Some Problems. J. C. Geiger.—p. 479.
Some Problems of Pediatric Gynecology. B. B. Weinstein.—p. 495.
Gall Stone Ileus. G. McHardy and D. C. Browne.—p. 501.
Intestinal Obstruction Following Use of Cotton: Report of 2 Cases. V. D'Ingianni.—p. 503.

New York State Journal of Medicine, New York

45:929-1040 (May 1) 1945

*Gastric Mucosal Atrophy and Carcinoma of Stomach. A. P. Stout.—p. 973.
Observations on Use of New Material for Cholecystography (Priodax): Preliminary Report. L. C. Collins and R. Golden.—p. 978.
Presbycardia, or Aging of Myocardium. W. Dock.—p. 983.
Vesicovaginal Fistula and Its Surgical Management. V. S. Counseller.—p. 987.
*Surgical Treatment of Chronic Constrictive Pericarditis. G. J. Heuer and H. J. Stewart.—p. 993.
General Résumé of Hematologic Disorders. E. G. Allen.—p. 999.

Mucosal Atrophy and Carcinoma of Stomach.—In the laboratory of Surgical Pathology, Columbia University, a number of surgically resected stomachs were treated by opening along the greater curvature, pinning out on a cork board, fixing in Bouin's fluid, and taking ten or more sections from different areas according to a definite plan. There were thus made available multiple sections from 150 stomachs, 50 with gastric carcinoma, 50 with gastric ulcer and 50 without gastric ulcer or carcinoma which were removed because of duodenal ulcer. The study revealed that mucosal atrophy may appear as early as the third decade and is found with increasing frequency and extent in the succeeding decades of life. In comparable groups of stomachs mucosal atrophy is found in a larger number and tends to be more widespread in those with cancer than in those without cancer. But when one tries to find actual progression from altered mucosal glands, gastric or intestinal in type, cystic or not, distorted or regular, it is realized that it is impossible to tell when there is juxtaposition of carcinoma and mucosal gland, whether the carcinoma is invading the gland or developing from its epithelial cells. In occasional stomachs with carcinomas multiple sections from various areas failed to show epithelial changes in some, while others showed only minimal changes. While atrophy of the gastric mucosal epithelium and cyst formation were present to a greater degree and in larger numbers in stomachs with carcinomas than in comparable stomachs without cancer, the exact relationship between these two conditions remained undetermined.

Surgical Treatment of Chronic Constrictive Pericarditis.—In a series of 18 cases reported by Heuer and Stewart enlargement of the liver was present in all, ascites in 15, edema of the extremities in 11 and pleural effusion in 8. Dyspnea on exertion or at rest was present in 17 and cyanosis in 14. Distention of the peripheral veins and an increase in venous pressure were present in all patients. The diagnosis of chronic constrictive pericarditis should be considered in patients with signs of congestive heart failure, in the absence of the common causes of this condition. The disease is commonly confused with mitral stenosis, cirrhosis of the liver, polyserositis and nutritional or other edemas. Tricuspid disease and mediastinal tumors may occasionally be wrongly diagnosed. All of the 18 patients were subjected to the operation of pericardiectomy. The authors stress the importance of preoperative treatment and careful attention to details in the operative procedure. They have performed 19 operations on 18 patients without a postoperative mortality. Seven patients are classified as cured over periods varying from one and a half to eight and a half years. Three patients more recently operated on have shown such improvement as to warrant the expectation of a cure. Four patients are greatly improved over periods of from three to six and one-half years. One patient is moderately improved and is living six years after operations. Four patients were not improved by the operation. Of these 1 is living seven years after operation and 3 have died.

North Carolina Medical Journal, Winston-Salem

6:229-264 (May) 1945

Meeting the Future of Medicine. C. S. Keefer.—p. 229.
Baccalaureate Sermon: The Beloved Physician. J. R. Cunningham.—p. 232.
Rupture of Uterus Subsequent to Cesarean Section, with Report of 3 Cases. H. L. Brockmann.—p. 234.
Chronic Headaches. J. R. Williams Jr.—p. 239.
Occurrence of Myasthenia Gravis in Patient with Multiple Sclerosis: Report of Case. L. H. Margolis and R. W. Graves.—p. 243.
Congenital and Hereditary Abnormalities of Extraocular Muscles. J. W. White.—p. 244.

Ohio State Medical Journal, Columbus

41:393-488 (May) 1945

Present Status of Prostatic Problem. H. L. Kretschmer.—p. 417.
Case of Osteomyelitis Treated with Penicillin with Unusual Bacteriologic Findings. W. G. Myers and Florence Lenahan.—p. 422.
Penicillin Therapy of Gonorrhea. H. E. Christman.—p. 426.
Final Diagnosis: Ruptured Appendicular Artery in Femoral Hernia. F. H. Newton.—p. 429.
Clinical Application of Blood Cholesterol Determination. R. G. Lehman.—p. 430.
When Should Poliomyelitis Patient Be Splinted? C. H. Heyman.—p. 432.
Multiple Venous Thromboses with Associated Carcinoma of Pancreas. E. B. Ferris and R. J. Ritterhoff.—p. 437.

Public Health Reports, Washington, D. C.

60:545-576 (May 18) 1945

Seroprophylaxis in Experimental Rabies. K. Habel.—p. 545.
*Tests of Epidemic Typhus Vaccines. R. Donovick and R. W. G. Wyckoff.—p. 560.

Tests for Epidemic Typhus Vaccines.—According to Donovick and Wyckoff the most direct laboratory method of testing epidemic typhus vaccine is one in which the immunity of vaccinated guinea pigs is challenged by injecting enough infectious tissue to produce typical guinea pig typhus in control animals. This test is hard to use routinely because it requires several weeks to carry out. Bengtson and Topping's development of the complement fixation test for typhus gives one of several other feasible ways for evaluating typhus vaccine. The authors compared the complement fixing antibody titers and results of protection tests on guinea pigs injected with many different typhus vaccines. Results of these two tests run parallel in the sense that vaccines which show an especially high degree of protective power also induce a particularly high average complement fixing antibody titer. Present typhus vaccines are superior to those prepared a year ago.

Union Médicale du Canada, Montreal

74:573-720 (May) 1945

Surgical Treatment of Chronic Polyarthritis. J. E. Samson.—p. 578.
Clinical Observations on Treatment of Wounds by Oxalic Acid: Action of Oxalic Acid on Hair Growth. H. Debidour-Monrad and J. Lassner.—p. 589.
Nonspecific Ulcerative Colitis. J. LeSage.—p. 593.
Case of Bronchopneumonia Treated by Bronchoscopic Drainage. V. Latraverse and A. Guilbeault.—p. 597.
Simplified Procedure of Osteosynthesis. G. Saint-Onge.—p. 599.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

53:135-162 (May) 1945

Trichomoniasis. R. B. Greenblatt.—p. 135.
Cesarean Sections in Oakland—1943. T. F. Bell.—p. 139.
Inversion of Uterus: Attending Physician's Responsibility for Immediate Replacement. C. W. Barrett.—p. 146.
Madura Foot. F. E. Clough.—p. 153.
Cleft Foot: Case Report. A. Gottlieb.—p. 157.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Heart Journal, London

7:1-56 (Jan.) 1945

*Patent Ductus Arteriosus and Its Surgical Treatment. A. R. Gilchrist. —p. 1.
Cardiac Manifestations in Case of Tuberous Sclerosis. F. P. Duras. —p 37.
Cor Triloculare Biauriculare: Unusual Adult Heart. J. B. Mehta and R. F. L. Hewlett.—p. 41.
Unusual Case of A-V Nodal Rhythm with Varying A-V Block. E. Simonson and N. Enzer.—p. 45.
Pericarditis and Complete Heart Block During Thiouracil Therapy. C. W. C. Bain.—p. 49.
Advanced Mitral Stenosis at Three Years Old. R. S. Johnson and D. Lewes.—p. 52.

Patent Ductus Arteriosus.—Of 28 consecutive patients with patent ductus arteriosus, operation on 14 was judged unnecessary or undesirable. Two died, 1 from intercurrent infection and 1 from subacute bacterial endarteritis. Slight deterioration in physical capacity was observed in 3. Two women married and have borne families without undue distress. In 1 patient, a boy of 6, the ductus closed spontaneously. Distinct improvement in the general health and physical capacity was observed in 6 of the 14 patients submitted to surgery. Four obtained less benefit than anticipated, chiefly because complete obliteration of the ductus was not always obtained. Two patients died after operation. Gilchrist puts emphasis on the value of repeated x-ray examinations in the diagnosis of the condition. Two patients operated on because of bacterial endarteritis died. Death in each instance was attributed to massive pulmonary collapse. The selection of patients for surgery demands careful consideration. The main factors to bear in mind are the age of the patient and the degree of cardiac embarrassment. In general, the younger patient should be accepted for surgery when symptoms are minimal, in the hope that by ductal occlusion the child may grow and develop normally. In older patients, on account of the increasing operative hazards, surgery can be justified only when symptoms, being more severe, warrant the risk. In the presence of an infected ductus, ligation should be undertaken without delay at any age.

British Journal of Industrial Medicine, London

2:1-64 (Jan.) 1945

Prevention of Accidents. H. M. Vernon.—p. 1.
*Clinical Effects of Use of Pneumatic Tools. D. Hunter, A. I. G. McLaughlin and K. M. A. Perry.—p. 10.
Methyl Bromide Poisoning: Account of 4 Recent Cases. C. A. Clarke, C. G. Roworth and H. E. Holling.—p. 17.
Methyl Bromide Intoxication. H. Wyers.—p. 24.
Methyl Bromide Burns. E. C. B. Butler, K. M. A. Perry and J. R. F. Williams.—p. 30.
Radiographic and Histologic Appearances of Rat Lung After Intratracheal Injection of Rouge (Fe_2O_3, Iron Peroxide). H. E. Harding. —p. 32.
Absorptiometric Method for Estimation of Atmosphere Benzene in Presence of Xylene and Toluene. R. Milton.—p. 36.
Estimation of Chloroform, Carbon Tetrachloride and Trichlorethylene in Blood. S. Habgood and Joan F. Powell.—p. 39.
Psychiatric Advice in Industry. A. Lewis, E. H. Capel, D. Elizabeth Bunbury and R. Fraser.—p. 41.

Clinical Effects of Use of Pneumatic Tools.—Hunter and his associates review observation on 286 workers who used pneumatic tools. White fingers were found in 48 riveters, 27 caulkers and 77 fettlers. The syndrome usually developed after they had been on the work for from two to five years. It occurred most frequently among workers who were using tools with a vibration rate of 2,000 to 3,000 a minute. The condition occurred most often in cold weather, and cold is probably a precipitating factor. White fingers rarely caused gross disability, but in 3 cases the condition was severe enough to make the men change their occupation. Arthritic changes were rare and there was no convincing evidence that they can be brought about solely by the use of pneumatic tools. The possibility, however, cannot be completely dismissed. Small areas of decalcification or bone cysts in the carpal bones were found in 35 riveters, 14 caulkers, 51 fettlers and 19 holders-up. This condition may be caused by repeated trauma, but it is not confined to workers who use pneumatic tools. The cysts cause no disability, and there is no evidence that they predispose to arthritis or fracture. Ulnar paresis was found in 3 cases, but only 1 case of Dupuytren's contracture was found in 286 workers. Bruising on the dorsum of the hand occurs in riveters when driving rivets in a vertical direction.

British Journal of Ophthalmology, London

29:169-220 (April) 1945

Electrical Cataract: Notes on Case and Review of Literature. A. L. Adam and M. Klein.—p. 169.
Effect of Ascorbic Acid on Occurrence of Hyphemia After Cataract Extraction. I. Mann and A. Pirie.—p. 175.
Aberrant Optic Nerve Fibers Found Between Retina and Hexagonal Cells. A. Loewenstein.—p. 180.
Effect of Detergent on Penetration of Sodium Sulfacetamide (Albucid Soluble) into Ocular Tissues. M. Ginsburg and J. M. Robson.—p. 185.
Modification and Extension of McReynolds' Operation for Pterygium. L. Staz.—p. 193.
Self-Inflicted Conjunctivitis: Account of Cases Produced by Jequirity and Castor Oil Seeds. E. J. Somerset.—p. 196.
Intraocular Foreign Bodies. W. O. Lodge.—p. 205.

British Journal of Surgery, Bristol

32:337-440 (Jan.) 1945

Wounds of Colon. B. C. N. Morgan.—p. 337.
Plasticity of Bone. J. F. Brailsford.—p. 345.
*Congenital Deficiency of Pericardium Associated with Bronchogenic Cyst. N. L. Rusby and T. H. Sellors.—p. 357.
Acute Appendicitis and Appendix Mass. A. G. McPherson and J. B. Kinmonth.—p. 365.
Stenosis of Small Intestine from Cicatrization of Isolated Inflammatory Lesions. M. Paul.—p. 371.
Carcinoma of Esophagus: Resection and Esophagogastrostomy. V. C. Thompson.—p. 377.
Preliminary Report on Use of Whole Skin Grafts as Substitute for Fascial Sutures in Treatment of Hernias. G. B. Mair.—p. 381.
Complete Rupture of Pancreas. J. F. Curr.—p. 386.
Ischemic Damage in Peripheral Stump of Divided Nerve. H. J. Seddon and W. Holmes.—p. 389.
Case of Traumatic Diaphragmatic Hernia. H. Reid.—p. 391.
Operation for Removal of Carcinoma of Esophagus with Presternal Esophagogastrostomy. H. Taylor.—p. 394.
Bilateral Renal Carcinoma. H. G. Hanley.—p. 399.
Traumatic Ischemia of Peripheral Nerves, with Observations on Volkmann's Ischemic Contracture. A. R. Parkes.—p. 403.
Retained Intraventricular Foreign Body. J. M. Small.—p. 414.
Aseptic Anastomosis in Gastrectomy. C. A. Pannett.—p. 418.
Right Retroperitoneal Diaphragmatic Hernia. N. R. Barrett.—p. 421.
*Control of Hospital Infection of Wounds. R. E. O. Williams, Barbara Clayton-Cooper, T. W. Howat and A. A. Miles.—p. 425.

Congenital Deficiency of Pericardium with Bronchogenic Cyst.—A girl aged 19 had partial deficiency of the pericardium associated with a solitary bronchogenic cyst, both on the left side. Rusby and Sellors review the literature relating to pericardial deficiency and show that theirs is the eightieth case placed on record, the third to be recognized during life and the only one carefully studied at operation. The symptoms of which the patient complained can be attributed to the lung cyst, which was removed. An uneventful recovery followed, and good health has been enjoyed since operation. The authors contend that the association of a lung cyst with a partial left-sided deficiency of pericardium lends weight to the view that the latter defect is the result of abnormal development with premature atrophy of the left duct of Cuvier. The name given to this condition by Keith, patency of the iter venosum, is believed to be accurate, and it possesses the added advantage of according well with the nomenclature in current use for other developmental abnormalities of the cardiovascular system.

Control of Hospital Infection of Wounds.—Williams and his associates undertook a survey in order to extend the observations of the effects of a revised dressing technic on the incidence of added hospital infection. As in previous investigations, the survey was made in terms of Streptococcus pyogenes, but these observations differ from them in that the authors examined wounds and personnel for the presence of Staphylococcus aureus as well and tried to assess the magnitude of the reservoirs of both these infecting organisms in the environment. During a control observation period of ten weeks the added infection rate per wound-week at risk in a surgical ward dealing mainly with septic wounds of the hands was

13.9 per cent for Streptococcus pyogenes and 100 per cent for Staphylococcus aureus. During a test period of twenty-six weeks, after the adoption of a revised wound dressing technic, the added infection rates were 0.75 per cent for Streptococcus pyogenes and 17.8 per cent for Staphylococcus aureus. The carrier and infection rates for the two organisms in the noses, throats and wounds of the patients and in the noses and throats of the nursing staff were similar in both periods. The number of wound weeks at risk was higher in the test than in the control period. The reduction in added infection may therefore be attributed to the revision of the dressing technic.

Practitioner, London

154:193-272 (April) 1945. **Partial Index**

Motor Driving Tests. D. J. A. Kerr.—p. 195.
Medical Standards of Fitness for Driving. H. A. Dunlop.—p. 201.
Alcohol and Road Accidents. S. Smith.—p. 205.
Abdominal Injuries Arising from Road Accidents. C. Noon.—p. 227.
Road Accidents: Some Medicolegal Problems. D. H. Kitchin.—p. 248.
Detection of Free Fluid in Abdomen. G. Ovens.—p. 256.

Revista Chilena de Pediatria, Santiago

16:97-167 (Feb.) 1945. **Partial Index**

*Anatomicopathologic Verification of Atelectasis in Epituberculosis in Children. G. Llodra and A. Guzmán.—p. 97.
Mediastinal Syndrome and Leukemia. J. Meneghello, H. Niemeyer and R. Eberhard.—p. 153.

Atelectasis in Epituberculosis of Children.—Llodra and Guzmán performed necropsies on 17 children with a clinical history of epituberculosis who died from accidents, from nontuberculous disease or from extrapulmonary tuberculosis. Pulmonary atelectasis was found to be the pathologic basis of epituberculosis in all cases. Atelectasis was recent in some cases and chronic in others. It was caused in some by constriction of the bronchi the result of compression by enlarged regional lymph nodes and in others by partial obstruction of the bronchi by local accumulation of tuberculous exudate. Old atelectasis manifested by foci of pulmonary induration was frequently associated with bronchiectasis.

Deutsche medizinische Wochenschrift, Leipzig

70:409-431 (July 21) 1944. **Partial Index**

Pain and Reflex Symptoms of Disease. K. Hansen.—p. 409.
Wartime Diet of Patients With Diabetes Mellitus and Dosage of Insulin. G. Katsch.—p. 413.
*Secondary Effects of Atabrine on Central Nervous System. H. Vollmer and H. Liebig.—p. 415.
Examination of Metabolism of Patients with Typhus. K. H. Schäfer. —p. 417.
Analeptic with Depot Effect. Heim.—p. 420.
*Treatment of Scarlet Fever with Convalescent Blood.—P. Klein.—p. 422.

Atabrine and Nervous System.—Experiments on rabbits and cats revealed certain secondary effects on the central nervous system of these animals. Psychosis and motor excitement were caused by suicidal attempts with large doses of atabrine (1.9 to 9 Gm.). Vollmer and Liebig report 4 recurrent cases of tertian malaria in which secondary effects on the central nervous system were observed. The occurrence of these reactions was in contrast to the opinion of other authors, who believed that reactions of this type do not result from the administration of therapeutic doses of the drug. The incidence (4 in 450 cases) was low. Psychosis resulted in 3 cases from intramuscular injection of atabrine, and psychosis associated with bulbar paralysis and flaccid paralysis of the lower extremities in 1 case. The aforementioned disturbances were of short duration. There were no irreversible cases.

Convalescent Blood Treatment of Scarlet Fever.—Klein obtained gratifying results from transfusion of convalescent blood in 34 severe toxic cases selected from 450 cases of scarlet fever. Mild and medium severe cases do not require this type of treatment. One transfusion was given to 28 patients, 2 transfusions to 5 and 4 transfusions to 1 patient. The amount of blood transfused varied from 110 to 300 cc., the usual amount being 220 cc. to 280 cc. In the majority of the cases the transfusion was given in the acute stage of the disease after the fourth day but not later than the tenth day. Good results were obtained likewise in 2 cases in which the transfusion was performed on the thirty-fifth day of the disease. The donors were convalescent after the third week of the disease. A pronounced improvement in the general condition is followed by a drop in temperature and decrease in pulse rate. The rash loses its color and desquamation sets in earlier, but these results are of minor importance. Complications occur in spite of the treatment. There is no danger of serum sickness, and the transfusion may be repeated as often as necessary. One cc. of racemic ephedrine administered at the start of the transfusion proved effective in preventing shock. A blood bank for stored convalescent blood is suggested. Good results obtained from transfusion of normal blood in 7 cases of scarlet fever suggest that normal blood may be used instead of convalescent blood when the latter cannot be obtained.

Klinische Wochenschrift, Berlin

23:1-44 (Jan. 22) 1944. **Partial Index**

Vegetative Systems of Brain Stem in Pathogenesis of Psychic Disturbances. M. Rosenfeld.—p. 1.
Part Played by Inhibition (Checking of Growth of Germs) in Entire Procedure of Combating Microbia. H. Dold.—p. 5.
Problem of Prevention of Growth in Vivo and in Vitro. K. Nikolai von Kaulla.—p. 8.
Typhus in Immunized Persons. H. Schulten.—p. 12.
Investigation on Usefulness of Synthetic Fat in Diet of Persons with Diabetes Mellitus and with Diseases of Stomach and of Liver. G. Kabelitz.—p. 13.
*Importance of Lymphatic Tissues (Thymus, Spleen, Lymph Nodes) in Pathogenesis of Tetany in Infants. A. Nitschke.—p. 16.

Lymphatic Tissue and Tetany of Infants.—Nitschke produced in rabbits the characteristic syndrome of tetany by injecting the precipitates of urine of 9 infants with tetany. The syndrome was manifested by adynamia, lowering of the blood calcium level, electric hyperexcitability and cramps. Recovery of the infants from clinical spasmophilia followed administration of irradiated ergosterol, but prolonged excretion of tetany producing substance in the urine continued for three to four weeks thereafter. Injection of urinary precipitates of 5 normal infants into rabbits did not produce lowering of the blood calcium level in the animals. The effects on the rabbits of the injection of urinary precipitates from infants with tetany resembled in its clinical aspect and the time of appearance of the symptoms and their duration the effects of administering extracts of thymus, spleen and lymph nodes previously reported by the author. This suggests that the two effects were caused by the same chemical substance. The new observations seem to prove the concept previously advanced that the lymphatic system is to be considered as an endocrine unity which produces, when hyperfunctioning, the clinical picture of tetany by its antagonistic effect on the parathyroids.

Acta Chirurgica Scandinavica, Stockholm

90:1-88 (April 29) 1944

Urinary Lithiasis in Childhood. C. C. W. Smith.—p. 1.
Bloodless Reduction, Under Roentgenologic Control, of Acute Volvulus of Sigmoid Flexure. F. Nørgaard.—p. 17.
Transpapillary Duodenal Drainage of Choledochus. C. van Gelderen. —p. 27.
*Value of Determination of Citric Acid in Blood Serum for Differential Diagnosis in Diseases of Liver and Bile Passages. L. Hagelstam. —p. 37.
Surgical Treatment of Pylorospasm. A. Bardy.—p. 71.
*Signficance of Blood Group Characteristics in Serum and Plasma Transfusions. K. Halvorsen.—p. 80.

Citric Acid in Serum in Hepatic and Biliary Diseases.—Sjöströms demonstrated in 1937 that the determination of the citric acid content in the blood serum is of aid in the diagnosis of diseases of the liver and the bile passages. The enzymatic chemical method of Thunberg is used for the determination of the citric acid. Hagelstam describes experiences with the Thunberg method. On the basis of studies on healthy persons he considers 24.35 micrograms per cubic centimeter the normal mean and 28 micrograms the normal maximum. Studies on patients with hepatitis revealed increased values in all severe cases. In the cases in which galactose epinephrine or Takata tests were conducted concurrently with the citric acid test the latter was found to be twice as sensitive as the galactose and Takata tests, while the epinephrine test showed the same sensitivity as the citric acid test. In patients with

stenosis of the common bile duct all but 1 showed normal values. Many patients with diseases of the gallbladder exhibited increased citric acid values. The author concludes that the citric acid test is of great value in differentiating between hepatitis and obstructive jaundice.

Blood Group Characteristics in Serum and Plasma Transfusions.—Halvorsen stresses that, in producing serum and plasma for therapeutic use, consideration must be taken of the blood group characteristics, and an attempt should be made to prepare a serum which is as free of these as possible. By mixing in suitable proportions, it is possible to prepare serums which are practically free of both anti-A and anti-B agglutinins as well as of antigens (agglutinogens) A and B. If citrated blood is used, the proportions 2 O, 1 A, 1 B will give a mixed plasma which is free of isoagglutinins and contains little antigen A and B regardless of the agglutinin titer of the individual components. If only serum or plasma is mixed, a mixture of equal parts of A and B serum or plasma with an isoagglutinin titer of 64 to 128 will be practically free of both isoagglutinins and antigen A and B. About half of the A donors and one third of the B donors can be expected to lie within this titer range.

Acta Psychiatrica et Neurologica, Copenhagen

19:1-411 (No. 1-2) 1944. **Partial Index**

Tentorial and Paratransversal Meningiomas. J. Arnvig.—p. 11.
Differential Diagnosis Between Acoustic Neurinoma and Meningioma of Posterior Face of Petrous Bone. C. C. Bager.—p. 23.
Value of Ophthalmodynamometry ad Modum Bailliart in Intracranial Tumors. M. Bardram and H. P. Neerdam.—p. 33.
*Cervical Disk Prolapse. B. Broager.—p. 45.
A New Approach for the Removal of Tumors of Third Ventricle. E. Busch.—p. 57.
Studies on Chronic Subdural Hematoma. Erna Christensen.—p. 69.
Meningiomas of the Falx. S. Ethelberg.—p. 149.
Contracture of Iliotibial Fascia in Sciatic Pain. K. Jespersen.—p. 195.
*Electrocoagulation of Gasserian Ganglion by the Kirschner Method. B. Oddsson.—p. 293.

Cervical Disk Prolapse.—In 5 of 285 patients with vertebral disk prolapse, the involved disk was in the cervical region: in 3 cases it was the sixth cervical intravertebral disk, in 1 case the fifth and in 1 case the fourth intravertebral disk. Four of the patients were men between the ages of 33 and 50, and 1 was a woman aged 46. The history revealed traumatic injury to the spinal cord in 3 of the 5 cases. Pain was the most common initial symptom. Only 1 of the patients had quadriplegia; 2 patients presented unilateral radicular paresis and atrophy, 1 of them with inferior paraparesis; 1 patient had inferior paraparesis only, and 1 had normal neurologic findings. The Brown-Séquard syndrome was present in 1 case. Sphincter disturbances were present in 1 case. X-ray examination revealed narrowing of the involved intravertebral space in 3; in all 5 a typical spondylosis deformans with osteophytes was demonstrated in the cervical spine, most pronounced at the level of the ruptured disk. Iodized oil myelography showed nothing characteristic of disk prolapse. A partial block was found in 2 cases and a total block was seen in 2. The three distinct syndromes described by Stookey as typical of cervical disk prolapse may be useful if the differential diagnosis is difficult between a small cervical disk prolapse and a case of intrinsic disease of the cord. But if the disk prolapse is large the syndromes of Stookey will not be of any help in the differential diagnosis between intraspinal tumor and disk prolapse. The history of a specific traumatic injury to the cervical spine combined with signs of an intraspinal tumor in this region should be suggestive of a cervical disk prolapse. These symptoms, combined with x-ray signs of localized spondylosis deformans of the cervical spine, and especially narrowing of an intravertebral space, would also point to disk prolapse.

Electrocoagulation of Gasserian Ganglion.—In the neurosurgical department of Rigshospitalet in Copenhagen 85 patients with trigeminal neuralgia have been treated during the last six years with electrocoagulation of the gasserian ganglion by the Kirschner method. The location of the foramen ovale having been found percutaneously with an apparatus specially designed by Kirschner, the ganglion is punctured with a trocar; the stylet is removed and a cautery probe is introduced with which the ganglion is electrocoagulated. The operation takes a few minutes. The patients were between the ages of 19 and 92. There were 54 women and 32 men. The duration of the neuralgia was on an average six years, the longest thirty years and the shortest three months. The right side was affected in 55 cases, the left in 28 cases; 3 cases were bilateral, 74 patients had major and 12 had atypical trigeminal neuralgia. Primary relief of symptoms was obtained in 66 cases, the remaining 20 having to undergo other treatment. The longest follow-up was fifty-one months, the shortest three months. The follow-up revealed that 25 patients were relieved of pain and 7 were substantially improved; 13 patients had a recurrence, which in most cases yielded to a repeated electrocoagulation. There were no fatal cases. The best results, both as to primary relief of symptoms and as to prevention of recurrence, were obtained in trigeminal neuralgia of the third division. Oddsson suggests that most patients with major trigeminal neuralgia should be treated with temporal retrogasserian neurotomy. If the patient is not likely to stand the operation, alcoholic injection or neurexeresis may be carried out in neuralgia of the first and second divisions, while in neuralgia of the third and perhaps also of the second division electrocoagulation of Kirschner should be performed. In special cases section of the sensory root alongside the pons by Dandy's subcerebellar route may be considered, but it seems likely that this operation will be superseded by the tractotomy of Sjöqvist, which has definite advantages.

Nordisk Medicin, Stockholm

21:245-316 (Feb. 11) 1944

Preparations of Different Infusions and Indications for Their Application. O. Wilander.—p. 245.
New Colloid Solutions for Infusion. A. Grönwall and B. Ingelman.—p. 247.
*Bone Changes in Diseases of Blood: Review. T. K. With.—p. 249.

Hospitalstidende

Myelography with Abrodil. J. Nordentoft.—p. 255.

Hygiea

*Neurologic Symptoms in Arthritis Deformans Humeroscapularis. K. Mårtensson.—p. 271.

Bone Changes in Diseases of Blood.—Characteristic bone changes in Cooley's erythroblastic anemia, sickle cell anemia and hereditary jaundice are seen almost exclusively in children and most often and in a most accentuated form in the cranium. In acute leukosis, where the bone symptoms are more important than in chronic leukosis, they may cause pain in the joints suggestive of rheumatic fever. In other forms of acute leukosis Baty and Vogt's symptom often occurs at an early stage and the x-ray appearance may establish the diagnosis before the typical blood picture appears. Relatively grave changes which simulate spondylitis may be seen in both children and adults. The bone marrow in aleukemic myeloid splenomegaly may be hyperplastic, apparently normal or fibrotic. Myelosclerosis is most often accompanied by osteosclerosis. The process need not affect the entire bony system. In lymphogranulomatosis maligna the hematogenic type of bone changes can be diagnosed by bone biopsy. In the local forms with involvement of the bone marrow the processes are usually destructive, but they may be sclerotic. In lymphogranulomatosis benigna there are cystoid clarifications in the small bones of the hands and feet; the joints are as a rule intact. In Gaucher's disease the specific tissue is always found in the bone marrow. In the long bones it may by its growth distend the bone. In Hand-Schüller-Christian's disease multiple bone defects constitute a cardinal symptom. Karscher's is the only general work on bone changes in disease of the blood; however, he considers them only from the radiologic point of view.

Neurologic Symptoms in Humeroscapular Arthrosis Deformans.—Mårtensson finds that in this disease pain and muscle hyperalgesia are due to irritation of the sensory end apparatus of the joints; transmission of pain takes place in the region of the fifth or sixth cervical segment or eventually both. Section of the affected sensory root may in suitable cases overcome the pain and lessen, perhaps even overcome, the limitation of movement.

Book Notices

Bronchial Asthma. By Leon Unger, B.S., M.D., F.A.C.P., Assistant Professor, Department of Medicine, Northwestern University Medical School, Chicago. Introduction by Morris Fishbein, M.D., Editor, Journal of the American Medical Association, Chicago. Cloth. Price, $9. Pp. 724, with illustrations. Springfield, Ill., & Baltimore: Charles C Thomas, 1945.

This is a comprehensive treatise on the subject of bronchial asthma. It includes an excellent discussion of the clinical phases of asthma and goes into a minute consideration of the allergic factors involved in its production. The clinical section of the book takes up the history, terminology, etiology, pathology, symptomatology, direct and differential diagnosis and treatment of bronchial asthma. These chapters are thorough and complete and include an excellent bibliography. The chapter on treatment should be of great practical value to the clinician, including as it does all known forms of therapy for this condition. Much that appears in the book should interest the physician who has already devoted some time and effort to the study of allergy. The laboratory section contains much useful information such as methods of preparation of extracts and the technic of pollen counts. The third part of the book is a compilation of detailed information on the sources of various allergens, elimination diets, instructions to patients and "patent medicines" used in asthma. The book is written in an easy, flowing style. It is well documented. The publishers did an excellent job with the format and the printing. The illustrations are instructive and helpful. The book should be of value to the internist as well as the allergist. It is a good clinical treatise on the subject of bronchial asthma and will make a valuable addition to one's medical library.

Primate Malaria. By S. D. Aberle, M.D. Issued by the Office of Medical Information (under grant of the Johnson & Johnson Research Foundation) March 1945. National Research Council, Division of Medical Sciences. Paper. Pp. 171, with 12 plates. Washington, D. C., 1945.

This monograph, which was issued by the Office of Medical Information of the National Research Council, is designed to give research workers a concise review and ready reference to the work published on the malaria of primates, exclusive of man. It has been prepared in association with the chairman, Dr. Robert S. Loeb, and the secretary, Dr. George A. Carden Jr., of the Board for the Coordination of Malarial Studies. Each section has been compiled with the aid of one or more of the American workers in the field of primate malaria.

There are nine main sections. The first section, on parasites, hosts, vectors and transmission of parasites, is largely contained in five extensive tables, which include such subjects as the prevalence of natural malarial infections, lists of species of primate malarial parasites with their natural and experimental hosts, classifications of hosts and parasites and transmissibility of the parasites. The second section consists of a brief account of the metabolism of Plasmodium knowlesi. The third section gives a summary of the course of various infections, with special reference to the stages of the infection, development of the parasitemia, hematology and body temperature. The fourth section, on the chemotherapy of primate malaria, consists chiefly of two extensive tables, the first of which (table 7) is a summary of the preparations used in treating primate malaria with the results of the treatments and the second of which (table 8) gives a review of each paper from which the previous summary table is constructed and includes the dosage of drug, method of treatment and antimalarial activity. The fifth section, on immunity, is a review of both the humoral and the cellular aspects. The seventh section deals with both microscopic and gross pathology. The eighth section, on morphology, consists of plates, including a reproduction in color of Gonder and von Berenberg-Gossler's description of Plasmodium kochi, a series of black and white plates showing the morphology and asexual cycles of Plasmodium cynomolgi, Plasmodium inui, Plasmodium knowlesi and Plasmodium brasilianum, a plate from Taliaferro and Cannon showing the phagocytic reactions during immunity to P. brasilianum and four plates from Taliaferro and Mulligan illustrating the histopathology of infections with P. knowlesi and P. cynomolgi. The eighth section is a description, classification and a key for identifying the macaques, written by Remington Kellogg. The final section is a bibliography consisting of 456 references. It is complete through Oct. 1, 1944 and indicates, besides the original publication, reprints and reviews which occur in the *Tropical Diseases Bulletin* and *Biological Abstracts*.

This monograph is one of the most important research tools that has appeared in the field. It is not written for general reading but has most of the material, either condensed to a minimum of writing or put in the form of tables. The various collaborators give the work undoubted authority. The bibliography is unquestionably the most extensive yet compiled for the subject. In addition, the author has had access to and referred to much of the unpublished work supported by the Committee on Medical Research of the Office of Scientific Research and Development. Reproduction of the monograph itself is noteworthy. The text has been printed directly from typewritten material by a planograph method. Both the text and the illustrations are excellent.

Discovery of the Elements. By Mary Elvira Weeks. Fifth edition. Cloth. Price, $4. Pp. 578, with illustrations. Easton, Pa.: Journal of Chemical Education, 1945.

Regardless of specialty, every one active in scientific fields is interested in various phases of history. The discovery of the elements provides no exception, and physicians, chemists and others should enjoy many sections in this book. It is the sort of thing which is useful in any library but will have added value in the libraries of teachers, research workers and the like. Included are twenty-seven chapters of discussions ranging from elements known to the ancient world to individual elements such as chromium, tungsten, tellurium and selenium, the inert gases, radioactive elements and more recently discovered elements. The index is adequate. There is a good appendix on chronology, a list of the chemical elements with their atomic number, symbol and 1943 atomic weight and an excellent list of illustrations. In fact, there are 349 illustrations. Many people regard the elements as comparatively recent discoveries, and yet some of the substances now recognized as chemical elements have been known and used since earliest history. This book brings that history up to date by adequate illustration and frequent quotation. It is revealing to pore over these quotations when one considers the periods in which they were offered.

Electroencephalograms of Normal Children. By Charles E. Henry, Brush Foundation and Department of Anatomy, Western Reserve University School of Medicine, Cleveland. Monographs of the Society for Research in Child Development, Volume IX, No. 3 (Serial No. 39). Paper. Pp. 71, with 13 illustrations. Washington, D. C.: Society for Research in Child Development, National Research Council, 1944.

Successive electroencephalographic records were made of 95 presumably normal children over a period of from five to eight years. A single record was made also of 540 "normal" children between the ages of 4 and 19. In the majority of cases rates stabilize by the eighth year, with a frequency between nine and eleven per second. Females tend to have faster alpha frequencies than males and a larger proportion of low voltage fast records. Correlation between frequence and intelligence could not be demonstrated. In a group of 583 "normal" children 5 per cent had abnormal and 6.9 per cent questionably abnormal records, although some of these were found to be normal a year later. This is a complete detailed study made under the auspices of the Brush Foundation, a valuable reference and example for persons interested in electroencephalography or in the development of children.

The Relation Between Illumination and Visual Efficiency—the Effect of Brightness Contrast. By H. C. Weston. Medical Research Council, Industrial Health Research Board, Report No. 87. Paper. Price, 9d. Pp. 35, with illustrations. London: His Majesty's Stationery Office, 1945.

This is a report of the Industrial Health Research Board of the British Medical Research Council dealing with the effect of characteristics such as size, contrast and brightness on the facility with which objects can be seen. It is highly technical and presents most interesting experimental work and conclusions that are of interest mainly to psychologists, physicists and physiologists. Clinical applications are not included in this brochure.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

PROPHYLAXIS OF OPHTHALMIA NEONATORUM

To the Editor:—With the advent of newer forms of chemotherapy the time is proper for reassessing the merits of the Credé treatment in the prophylaxis of ophthalmia neonatorum. Several weeks ago I saw a newborn infant which, although it had received at birth an instillation of a 1 per cent solution of silver nitrate, developed gonorrheal ophthalmia. The infant was given sulfadiazine therapy by mouth, 1 grain per pound of body weight, and within four days was clinically and bacteriologically free from the disease. Since silver nitrate prophylaxis occasionally fails to prevent gonorrheal ophthalmia, and since it often produces a pronounced chemical conjunctivitis, would not a 1 per cent solution of sodium sulfadiazine or a solution of penicillin 200 Oxford units per cubic centimeter be of more value in prophylactic therapy? The latter chemotherapeutic agents are certainly less irritating than the silver nitrate solution.

Henry Rascoff, M.D., Brooklyn.

To the Editor:—Recently I have had 2 cases of gonorrheal ophthalmia in which 1 per cent silver nitrate solution in wax ampules was used. In using this solution should it be washed out immediately with isotonic solution of sodium chloride or should it be left in for a period of time? Should this procedure be left to the nurse in charge or should it always be done by the doctor? Is there any other solution more effective?

B. L. Lingeman, M.D., Crawfordsville, Ind.

ANSWER.—1. The Credé method of prophylaxis has been time tested since it was first advocated in 1880 and has proved to be remarkably effective in reducing the incidence of gonorrheal ophthalmia. It is still the standard procedure required by law in most states and should not be abandoned until certain proof of superior performance by a substitute method has been established. Its occasional failure can be attributed in most cases to faulty application or, in a few instances, to exceptionally prolonged labor which allows actual bacterial invasion of the conjunctiva to take place prior to birth. The chemical conjunctivitis produced by single-drop instillation of a 1 per cent solution of silver nitrate is of minor importance and should not militate against this use of the drug.

Single instillations of a 1 per cent solution of sodium sulfadiazine or a solution of penicillin (200 Oxford units per cubic centimeter) could not be expected to prove effective, as both agents require prolonged action to effect sterilization. In ointment form, however, effective concentrations can be maintained for from four to six hours, so that single instillations of 5 per cent sulfadiazine or 5 per cent sulfathiazole ointments, or of sodium penicillin ointment (500-1,000 Oxford units per cubic centimeter) or, preferably, three or four instillations of these preparations at four to six hour intervals, would be effective theoretically. The low tear production in infants during the first few weeks of life reduces the factor of dilution, which notably interferes with the local action of sulfonamide or penicillin in the adult eye. Oral administration of a total of 20 grains (1.3 Gm.) of sulfathiazole over a three day period, as recommended by Gleich, Blumberg and Mason (*Am. J. Dis. Child.* **67**:472 [June] 1944) would certainly be effective but would seem to introduce unnecessarily the risk of sulfonamide toxicity. The occasional occurrence of sulfonamide and penicillin resistant strains of gonococci would be a further complicating factor.

The sulfonamides would have the advantage of providing prophylaxis also against inclusion blennorrhea, which is the most important type of nongonococcic ophthalmia neonatorum and is not prevented by the Credé method. Penicillin is known to be inactive against this disease. The possibility of sensitizing the infants to the sulfonamides or to penicillin should receive consideration but would probably occur so exceptionally as to be insignificant. Final conclusions must await publication of the several research projects known to be in progress.

2. When 1 per cent silver nitrate is used, neutralization is unnecessary. Credé originally employed 2 per cent silver nitrate, and if this strength is used neutralization with isotonic solution of sodium chloride after an interval of a few seconds is advised. The instillation of silver nitrate should invariably be done by the physician, or at least supervised by him, to make certain that the drop reaches and spreads over the entire conjunctival and corneal surface. There is as yet no other solution known to be more effective as a prophylaxis against gonorrheal ophthalmia.

CONTROL OF TICKS IN TROPICAL MEXICO

To the Editor:—A patient and a group of friends have purchased land in Chiapas, Mexico. One difficulty at the camp which causes trouble every year is described by the patient as follows: "We are on the edge of the cattle country, and the grass and brush are full of ticks, some almost too small to be seen and others like small spiders. There are both hard and soft ticks. Almost every time we go out of the camp we return with our skin peppered with them. We detick at every opportunity, but still we get hundreds of bites. They spoiled our dispositions for the first month or two. Some of us are now developing a sort of immunity, but others are having real trouble. One girl has big festering sores, almost boils, all over her legs. Her whole legs swell and pain her; she has had some fever from them and has been really laid up for about three weeks. Usually we have small vesicles form and harden so that they itch like chickenpox. The glands in the groins swell and become tender." What can be suggested for this group?

Louis L. Sherman, M.D., Oakland, Calif.

ANSWER.—Serious annoyance from ticks is encountered in many parts of the tropics. The species which causes most of the annoyance in tropical Mexico is probably the Cayenne tick known scientifically as Amblyomma cajennense. The small specimens mentioned are seed ticks, the ones "like small spiders" are nymphs, and the larger ones are the adults, males and females. The latter engorge with blood of various wild and domestic animals, becoming as large as the end of the little finger, and then drop off and deposit five or six thousand eggs on the ground and die. The eggs soon hatch into seed ticks.

There is no very satisfactory way of eliminating these pests from an area that is frequented by livestock or wild animals that serve as hosts. Excluding such animals and keeping the grass and underbrush closely cut will ultimately materially reduce the numbers of the pests. Some control can also be effected by spraying around habitations and along paths and roadways with a solution containing 4 teaspoons of a 40 per cent solution of nicotine sulfate, 1/10 ounce of soap and 2 ounces of sodium fluoride to 1 gallon of water. This spray will cause some burning of foliage. Much protection of the individual can be obtained by dressing to exclude the ticks. This involves wearing trousers inside high top shoes and having tightly closed flies on trousers and shirts. A rag soaked in kerosene and tied about the top of the shoes helps keep them off. Certain repellents have value in protecting individuals, but these are not at present available to civilians since the supplies are being devoted entirely to military uses.

MORPHINE AS A CAUSE OF DEATH

To the Editor:—Is there any record of hypersensitivity to morphine administered hypodermically in 1/4 grain dosage? Is there record of such a dose's causing death by respiratory paralysis in adults? What is the smallest dose of morphine, administered hypodermically, known to cause death?

M.D., North Carolina.

ANSWER.—There is a considerable variation in the sensitiveness with which individuals react to morphine. Some individuals require much smaller doses of morphine to produce a given result than do others. This could be considered as a hypersensitivity to a usual dose. Elderly persons tolerate morphine poorly. A quarter of a grain of morphine is the usual dose used for an adult, although the official dose is smaller.

Reports of death by respiratory paralysis in adults caused by 1/4 grain of morphine have not been found. However, if the respiration was much embarrassed from other causes, the morphine could conceivably aggravate the condition.

The average fatal dose of morphine in man is stated to be about 0.005 Gm. per kilogram of weight. There does not appear to be any record of the smallest dose of morphine administered hypodermically which is known to cause death.

SENSITIVITY TO SULFATHIAZOLE

To the Editor:—Is it reasonable to assign an acute flare-up of dormant phlebitis of the leg as a toxic reaction to the local use of sulfathiazole ointment? If there is a causal relationship, would it be a toxic manifestation or an allergic reaction? A patient sustained second degree burns of two fingers, and sulfathiazole ointment was applied. He subsequently developed a skin reaction of the extremities and also an acute exacerbation of a previously existing phlebitis in the leg. My review of the literature does not indicate phlebitis as an encountered complication following the use of the sulfonamides.

M.D., New York.

ANSWER.—It is to be assumed that the "skin reaction" of the extremities was a manifestation of hypersensitivity to sulfathiazole. It is difficult to interpret the genesis of the exacerbation of the phlebitis. While vascular lesions have occurred as a result of sensitivity to the sulfonamides, such as periarteritis nodosa, the appearance of thrombophlebitis has not been recorded. Therefore one cannot state that the phlebitis described in this case was a manifestation of sulfonamide sensitivity or toxicity.

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PSEUDOBULBAR PALSY

To the Editor:—A white woman, aged 57, widowed, presents extreme dysarthria, mildly ataxic gait, emotional instability and moderate mental deterioration. These symptoms have been developing during the past two or three years, becoming progressively worse. Her father died at 74 from pneumonia; her mother is living at the age of 100; a brother died in a state hospital at the age of 62; the diagnosis was chronic bulbar paralysis with psychosis. He had had a neurologic condition for four or five years before his death. It is stated that the father and the father's mother were afflicted with a condition similar to the brother's. The patient has two normal children and one feebleminded child. This patient's serologic reaction, including a spinal fluid examination, is entirely normal. Her neurologic examination reveals an ataxic gait; she walks with a wide base; she has no cooperation for walking a straight line and on the heels and toes; Fournier tests were negative. Coordination: Romberg negative; FF & FN tests fairly well done; no decomposition of movement; no asynergia; no adiadokocinesis. Abnormal movements: none. Reflexes: Biceps, triceps, wrist 3 plus and equal, patellars 4 plus; abdominals not elicited; Babinski present on left, questionable on right. No clonus obtained. Muscular system: a moderate amount of muscular hypertonicity is present; there are no localized atrophies and no diminution of strength in the extremities. Sensory: negative so far as could be determined. Cranial nerves: I, olfactory sense normal. II, fundi normal. III, IV, VI, eye movements normal, no nystagmus, pupils slightly irregular, react to a limited extent to light. V, weakness of mouth muscles and muscles of mastication not observable; corneal reflex present. VII, no evidence of facial paralysis. VIII, hearing normal. IX, X, pharyngeal reflex present, no paralysis of uvula. XI, able to rotate head and raise shoulders. XII, speech definitely impaired; seems unable to protrude tongue. Positive neurologic findings: 1. Muscular hypertonicity with increased deep reflexes. 2. Babinski, absent abdominals. 3. Ataxic gait. 4. Pronounced speech defect. 5. Emotional instability. There is nothing remarkable about the patient's mental condition except for a moderate forgetfulness and dementia. What are the diagnostic possibilities? She does not seem to fall into any of the well recognized neurologic syndromes. It seems that multiple sclerosis is a possibility, but her age and the fact that multiple sclerosis does not tend to be familial or hereditary are against this diagnosis. She does not show the typical symptoms of progressive bulbar palsy or pseudobulbar palsy. Amyotrophic lateral sclerosis, syringomyelia and spastic spinal paralysis can be ruled out. She does not have a cerebellar syndrome. Any suggestions that you may have as to the diagnosis will be appreciated. M.D., Ohio.

ANSWER.—In this case the dysarthria without loss of pharyngeal reflexes would seem to justify classifying the syndrome in the general category of pseudobulbar palsy. The dysarthria is undoubtedly due to bilateral supranuclear lesions of the lower cranial nerves. Such lesions often interrupt corticospinal and cerebellar pathways also, producing unilateral and bilateral rigidity and ataxia. Disturbances of emotional expression are usually present if the degeneration is widespread and are attributed to lesions of the thalamus. Such a syndrome may be produced by a number of destructive processes, of which arteriosclerosis is the most common and seems the most likely in this instance. What is extremely unusual is the familial incidence. A cursory examination of the literature has not revealed any similar groups of cases.

TOXICITY OF ISOPROPYL ALCOHOL

To the Editor:—Can isopropyl alcohol be injected in small amounts intravenously and not be toxic? I understand that when used in 98 per cent strength this alcohol is as antiseptic as 70 per cent ethyl alcohol. The reason the question is asked is that I give intravenous injections of different drugs in which I have used ethyl alcohol to sterilize the syringes and needles. I have never been concerned with the small amount of ethyl alcohol that might cling to the needle or syringe and be injected. Can I use isopropyl alcohol in the same manner?

Perry Sperber, M.D., Providence, R. I.

ANSWER.—Since no specific information on this question could be found in published literature, some animal experiments were undertaken with the following results. Isopropyl alcohol differs from ethyl alcohol in that the bactericidal effects of the former increase steadily as its concentration approaches 100 per cent, whereas the maximal bactericidal strength of ethyl alcohol is 70 per cent by weight (Price, P. B.: Ethyl Alcohol as a Germicide, *Arch. Surg.* **38**:528 [March] 1939). In vitro, pure (99 per cent) isopropyl alcohol is a strong precipitant of plasma protein, its coagulating effect being greater than that of 95 per cent ethyl alcohol and much greater than that of 70 per cent ethyl alcohol. Dilutions of isopropyl alcohol as weak as 20 per cent cause perceptible clouding of plasma. Even small amounts of pure isopropyl alcohol cause prompt coagulation of tissues. Less than 0.1 cc. of isopropyl alcohol injected intradermally into a dog's abdomen produced a small area of necrosis which eventually sloughed, leaving a sluggish ulcer. Graded amounts of isopropyl alcohol, 0.2, 0.4, 0.6 and 0.8 cc., injected subcutaneously, produced deep necrosing ulcerations of graded sizes which showed relatively little progress toward healing in three weeks. Less than 0.1 cc. of the alcohol injected into the wall of the exposed femoral vein immediately produced a spot of coagulation in the wall, inviting secondary hemorrhage. When 0.5 cc. of isopropyl alcohol was injected into the femoral vein of a large dog, a clot developed in the lumen, plugging the vein; when the animal was killed half an hour later, most of the clot had disappeared and the vein was patent but the embolus could not be found. Intra-arterial injection of as little as 0.5 cc. of isopropyl alcohol caused perceptible hemolysis in the circulating blood of a large dog, but no other toxic effects were observed after injection of 2 cc. The inference to be drawn from these experiments is that isopropyl alcohol, used in the manner indicated in the query, is not without danger and is not to be recommended.

PATENT DUCTUS ARTERIOSUS

To the Editor:—In a so-called blue baby that continues to be more or less cyanotic, is it possible to determine whether the condition is due to a patent ductus arteriosus or to some other heart condition? If the ductus arteriosus is patent can a young child be operated on? What are the chances of success? What surgeons do this type of work and where are they located? As a rule is it better to have such an operation done when the child is a few months old or to wait longer? What are the chances of such an infant's surviving if left alone?

Charles L. Entner, M.D., Connersville, Ind.

ANSWER.—Patent ductus arteriosus, unless complicated by other congenital cardiac lesions, rarely if ever causes cyanosis in infants. If a patent ductus arteriosus is present, a loud continuous "machinery" murmur should be audible in the second left interspace, and the diastolic blood pressure may be unusually low with a normal systolic blood pressure. The operative treatment of patent ductus arteriosus in cases uncomplicated by other congenital defects has been successful in recent years since the pioneer work of Dr. Robert Gross of the Children's Hospital in Boston. However, since cyanosis is present in the patient under consideration, there is little likelihood that an uncomplicated patent ductus arteriosus exists. Careful physical examination of the heart, x-ray examination of the chest and an electrocardiogram should help to clarify the diagnosis. The optimum time for operation seems to be in early childhood at the age of 4 to 6 years, although ligation has been done in adult life. The average duration of life in Abbott's series of patients not operated on was twenty-four years.

HEREDITY OF ACHONDROPLASIA

To the Editor:—Recently a patient was delivered of an achondroplastic dwarf. There had been one previous pregnancy with a normal delivery and a normal child. There is no family history of achondroplastic dwarfs. What are the possibilities—and if possible the percentage chance—of the patient's having a future achondroplastic dwarf? M.D., California.

ANSWER.—Achondroplasia may appear as a mutation in a family, there being no previous history of the condition. Usually, however, the condition is hereditary and when so it is inherited as a single mendelian dominant. Its chance of occurring increases appreciably with the increasing age of the parents. It has been reported in five generations of a Mormon family. Of 22 offspring of the first dwarf in this pedigree, by two wives, 7 individuals were affected. Six of these persons married, and of their 49 children 24 showed the trait. The normal persons in this pedigree did not give rise to any affected offspring.

The percentage chance that normal parents of an achondroplastic dwarf will have another affected child cannot be stated. In general, however, the parents of a congenitally malformed child are twenty to twenty-five times more likely to give rise to another defective child than are parents all of whose children have been normally developed. Furthermore, if 2 children in a family exhibit congenital defects, there is a 50 per cent chance that the same defect will reappear in a subsequently born brother or sister.

VITAMIN E AND ARTHRITIS

To the Editor:—What therapeutic value has vitamin E in the treatment of fibrositis, arthritis, myositis and allied conditions?

Edwin P. Bickler, M.D., Milwaukee.

ANSWER.—As far as human beings are concerned there is no proof of value of vitamin E for these disorders at the present time.